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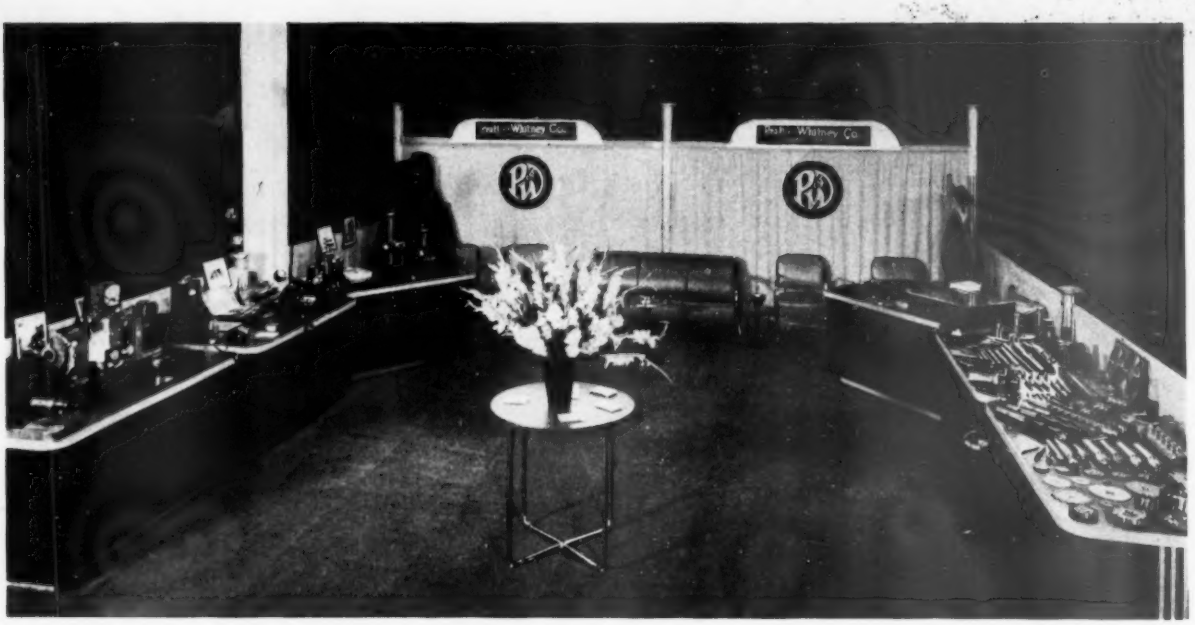
APRIL
1938

Official Publication of the
AMERICAN SOCIETY OF TOOL ENGINEERS



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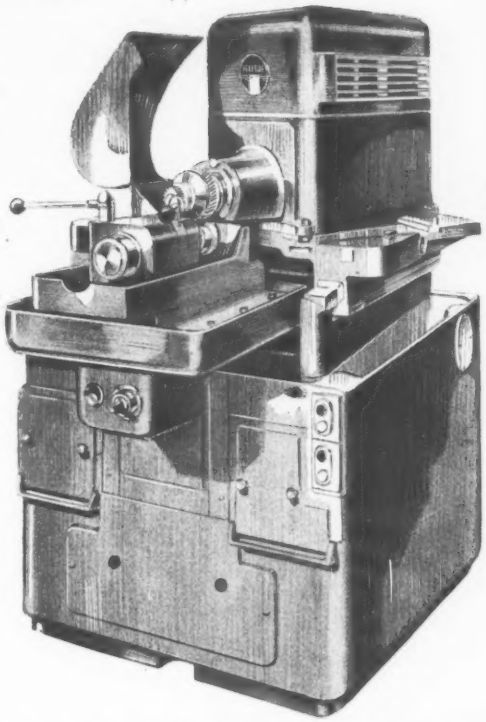

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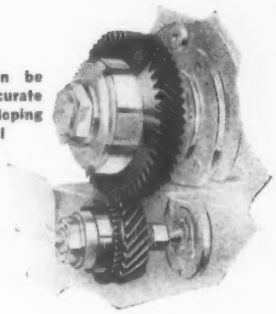

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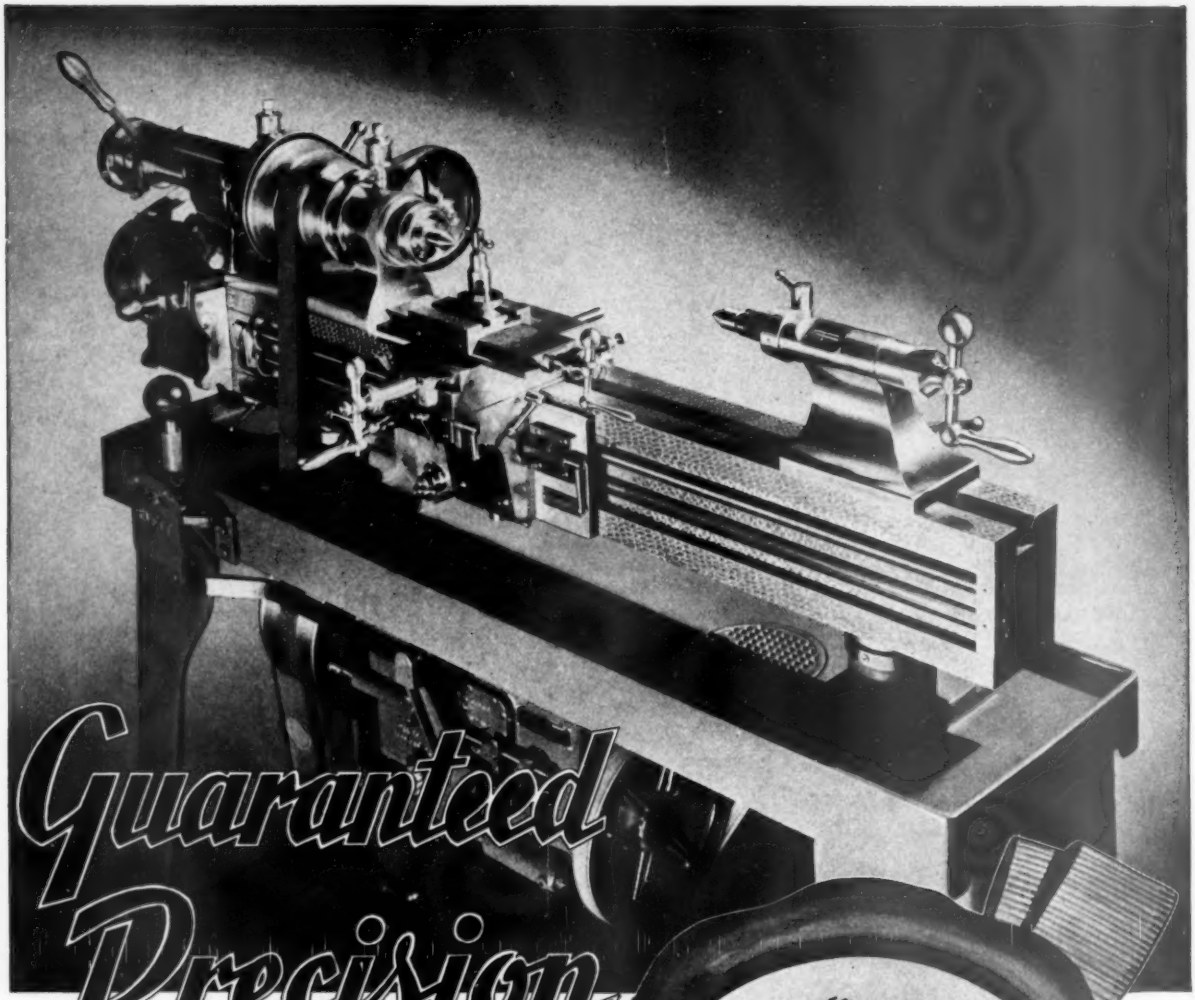

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The Tool Engineer

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Official Publication of the AMERICAN SOCIETY OF TOOL ENGINEERS

Vol. VI | APRIL, 1938 | No. 12

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Owing to the nature of the American Society of Tool Engineers, a technical organization, it cannot, nor can the publishers be responsible for statements appearing in this publication either as papers presented at its meetings or the discussion of such papers printed herein.

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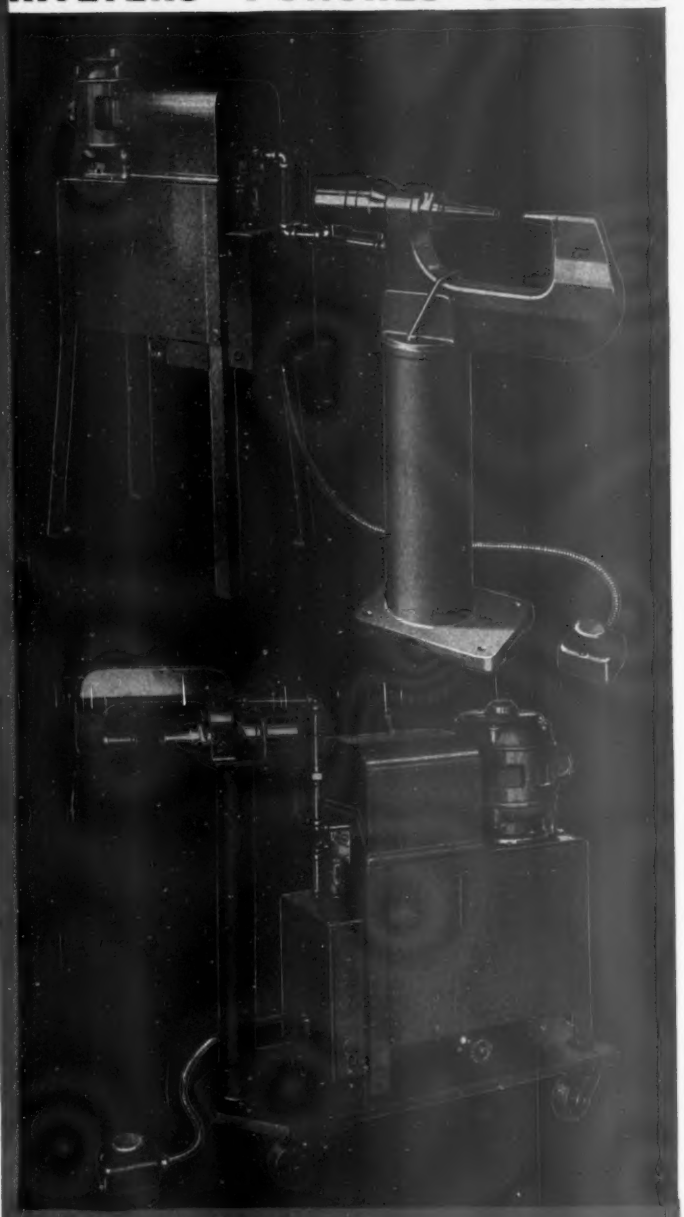

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EDITORIAL

By
A. E. Rylander

"Nut Crackers" and Engineers

A Tool Engineer, who for the nonce must remain anonymous, told this story of his early years in the field of tools: As an apprentice in a Toledo plant he worked under a man highly trained in machine shop practice. One day the boy said, "You know, some day I hope to be a graduate engineer like yourself." "Graduate engineer! Hell, son, I'm just a nut cracker." "A nut cracker?" the boy puzzled. "And what's a nut cracker?" "Well, I'll tell you. When you ask a college graduate to remove a rusted nut he can't do it, but the man who came up from the ranks just takes a chisel and cracks it off."

"And you know," our anonymous friend concluded, "I just about worshipped that man, who termed himself a 'nut cracker' but who was really a highly qualified Tool Engineer of the practical school."

Further discussion brought out that our friend—but let's call him George Jay, since we have no member by that name—had to leave school at the age of twelve, then, progressive and capable, gradually worked himself up through the ranks to a position of importance. Later, joining the American Society of Tool Engineers, he has become one of its most enthusiastic supporters.

"What I like particularly about the A. S. T. E.," he said, "is that it recognizes a man because of merit, that recognition does not depend on diploma or college degree. If a man, by dint of hard work and application, promotes the science of Tool Engineering and incidentally advances himself, he gets as much recognition in the Society as the Graduate Engineer."

All that, of course, is true enough; however, there is a considerable proportion of college graduates in the ranks of the A. S. T. E., and these are as enthusiastic about the Society as George Jay. But degree or lack of degree is not an issue among Tool Engineers, except as a topic of good natured debate; the essential requisite is a knowledge of tools and their application in the manufacture of product. Recognition is for superior performance and leadership, with encouragement for the comer. The Society, however, is keenly alive to the value of college education, encourages the teaching of Tool Engineering in our colleges. It is keenly alive to the need of practical training, since even theory must eventually resolve itself into practical application.

In this respect the A. S. T. E is unique among engineering societies, and this coordination between theory and practice is one of the reasons for The Society's phenomenal growth. Its membership runs the gamut from men internationally famous in the design and manufacture of tools to juniors just learning to detail; from noted educational leaders in engineering to students just enrolled; from plant executives in high positions to tool and die designers on the board, all gathered together to promulgate and further the science of Tool Engineering. Meeting on common ground, they exchange ideas, promote good fellowship mutually, in a few short years, have made the world conscious of the place of the Tool Engineer in industry and in the advancement of our modern civilization. They have mutually developed, in this A. S. T. E. a friendly Society.

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Walter F. Wagner, elected President of A.S.T.E., has served The Society during the past year as Second Vice-President and has been a Director and served on the Constitution and By-Laws Committee. He is master mechanic of the Lincoln Motor Car Company, with which organization he has been associated since 1922. Mr. Wagner started his mechanical career in the shop of E. R. Thomas Motor Company, Buffalo, as an apprentice in the engineering department. In 1909 he joined the tool design department of the Ford Motor Company. Then came five years at Cadillac, Studebaker, Maxwell and Oakland Motor Car Companies, with chief tool designer's appointments at the Republic Motor Truck and Hudson Motor Car Company before he re-joined Lincoln when it was acquired by Ford.

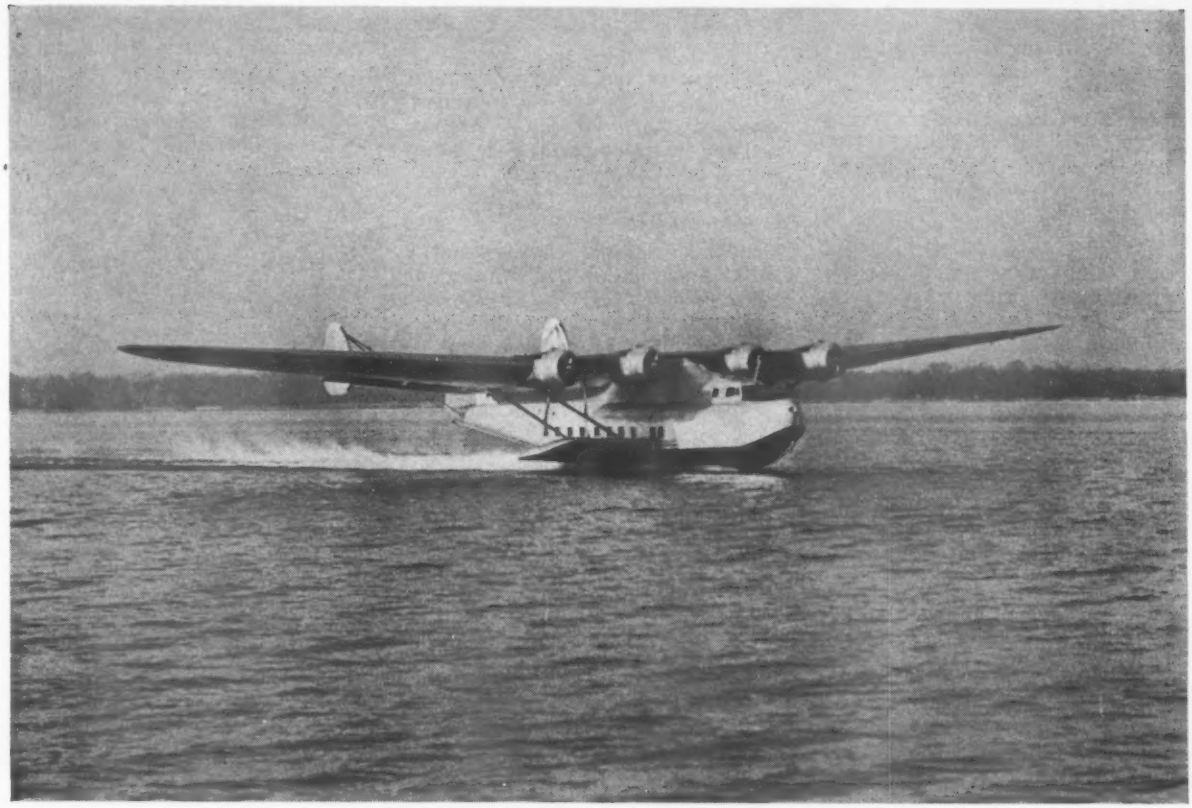
James R. Weaver, who has been elected First Vice-President of the A.S.T.E. for 1938-39. Mr. Weaver was born at I[illegible]in, Pennsylvania, and attended Irwin High [illegible]ool. He finished his apprenticeship as [illegible]inist in 1914 at Westinghouse Airbrake [illegible]mpany in Wilmerding, Pennsylvania, [illegible]5 joined the Westinghouse Machine Co[illegible]ny as a tool designer. During the world [illegible]r, Mr. Weaver enlisted in the United States Navy as a machinist's mate, passed the examination for a commission and entered Annapolis for a four months' training course. Leaving there with a commission as Ensign he served on the U.S.S. Connecticut as a Junior Division Officer. After the war he returned to the Westinghouse Machine Company as assistant superintendent of tools and equipment, later transferring to the Westinghouse Electric and Manufacturing Company as works mechanical engineer. Mr. Weaver has served this company, his present connection, in various capacities, from assistant superintendent of equipment, works equipment engineer to director of equipment, inspection and tests, which position he holds at the present time. He has been President of the North Irwin Council for the past fourteen years. Mr. Weaver is married, and has four children. His principal recreations are golf and bowling.

George A. Smart, elected Second Vice-President of A.S.T.E. for 1938-39. Mr. Smart was born at St. Cloud, Minnesota, and was educated in the public schools of that city. He is a graduate Mechanical Engineer of the University of Minnesota, class of 1916. He served his apprenticeship at the Santa Fe Railroad at Fort Madison, Iowa. During the war he enlisted and served in the aviation corps at St. Paul, Minnesota. After his enlistment he worked as a die sinker, estimator and designer with the Pau Motor Company at St. Cloud, Minnesota. When this firm closed its doors he secured a position with the Pittsburgh Knife and Forge Company, Coraopolis, Pennsylvania, as estimator and die designer, later serving as tool room foreman. Finding himself unable to become acclimated to the Pittsburgh climate he was forced to return to his home region and connected with the Unit Forge Company, West Allis, Wisconsin, as their die designer and tool room foreman. After eight years with this company he was employed by the Allis Chalmers Manufacturing Company in 1930 where he has served in the following capacities: tool designer on forging dies, in charge of tool design, in charge of special tool design, assistant superintendent of maintenance and tool supervisor, the position which he now holds. Mr. Smart is the author of a series of articles on heat treating and forging and on forging die design.

Frank R. Crone, re-elected National A.S.T.E. Treasurer for 1938-39, is a charter member of the Society. He will have held his present office for three consecutive years. At present he is chief tool designer for Lincoln Motor Car Company, where he has been associated since he returned from overseas during the world war. Prior to that he was tool designer and Tool Engineer with such companies as Doble Steam Car, Saxon, Studebaker, Cadillac and Maxwell. During the war he was responsible for installation drawings of bombing devices and machine guns in various types of planes, in Paris.

Charles F. Staples, elected National Secretary, has served The Society as Detroit Chapter Chairman, Chairman of Industrial Relations Committee, and as a member of the Meetings Committee. At present he is Chief Engineer of the Giern & Anholtt Tool Company. Born in Detroit, his mechanical career was begun in 1907 with the Regal Motor Car Company, Detroit, where he was a machinist until 1911. During this time he attended night school at Miles College and Detroit Public Schools. He first designed tools with the Packard Motor Car Company in 1911. In 1912 he became tool designer and factory trouble man with the Chalmers Motor Car Company, where he remained until 1916. Later he was affiliated with such companies as Remington Arms U.M.C. Company, Bridgeport, Conn., Torbensen Axle Company, Timken Detroit Axle Company, Jig Bushing Company, Pioneer Engineering and Manufacturing Company. During these years Mr. Staples completed courses in Executive Training and Business. He was the manufacturer of a home washing machine, has secured and sold six United States and two Canadian patents covering washing machines and automobile axles.

Ford R. Lamb, Executive Secretary of The Society since May, 1937, is a past president of the organization, as well as a charter member. To him goes a very large portion of the credit for the tremendous success of the recent Annual Meeting and Machine and Tool Progress Exhibition. Mr. Lamb is an extremely hard working executive who loves his work and The Society, which he is successfully making the leading engineering organization in the nation. He is a practical Tool Engineer who has been actively engaged in such work in the past, has taught tool designing and Tool Engineering, and is the inventor of a stud-setter which is now widely used throughout the industry.



The "Russian Clipper"—example of modern aircraft manufacture. Authorized use of this photograph by courtesy of The Glenn L. Martin Company, Baltimore, Md.

AN INDUSTRY *Evolves*

By LESLIE MAC GREGOR

MEMBER A.S.T.E.

ON that memorable day when the Wright Brothers took to the air in the first powered flight of a heavier-than-air machine, the whole World was amazed. It was as if something supernatural had happened. The force of gravity, as ancient as the Earth itself, that ever present irresistible force had at last been overcome by an artificial machine. That was news indeed. What the World failed to realize, however, was that when Wright's tailskid left the ground, a great industry was born. The evolution of that industry to what it is today, is a story stranger than fiction. Its characters are a heroic band, its pages are covered with glory.

Soon after the Wright Brothers made their first flight, pioneers began to appear in other countries. It was through the prophetic vision of these men, plus their daring thirst for adventure, that the aeroplane was gradually changed from a dangerous flying machine, to a very pleasant and normal mode of transportation. As these pioneers invariably flew in aircraft of their own construction, it may be said that they were at once possessed of the vision of the designer, the profound knowledge of the engineer, the skill of the mechanic, and the daring of the pilot.

When the World War broke out in 1914, aircraft was not yet considered of great value, from a military or naval standpoint. True, each warring nation had a contingent of aeroplanes, but they were used exclusively for observation purposes. In fact, the average militarist of that day viewed the aeroplane with much disfavor.

When enemy craft met while on observation flights, the occupants would start blazing away at each other with revolvers, and many a [illegible] brought down by this [illegible]. This soon led to the [illegible]on of machine guns, and th[illegible] to the invention of the interrupter mechanism for firing through the propeller circle without injury to the blades. By the aid of this ingenious arrangement, a pilot could go aloft by himself and by pointing his ship at his target would automatically have his adversary in his line of fire. So was developed the single seater scout, or pursuit

ship. As the war went on, aeroplanes were needed in greatly increasing numbers. Aerial combat took its deadly toll of casualties, and surviving craft became obsolete very quickly. The period from 1914 to 1918 was responsible for more advancement in aeronautics than any other four years in the history of the industry.

During the years immediately following the war, little progress was made. It seemed as if the huge stocks of equipment accumulated by the Government during the war would have to be used up, before private enterprise could get going. In the year 1927 came the boost that post war aviation sorely needed. I refer to the audacious flight of Charles A. Lindberg, from New York to Paris. That flight demonstrated more than any other, the possibilities of the heavier-than-air machine. Since then the building of aircraft has become one of our most important industries. Its product is vital to us due to its connection with our national defense, and that other necessary phase of modern life, Transportation.

In these days of mass production, the all important requirement is efficient tooling. The automotive industry has proved conclusively that with proper tools, parts can be machined or formed to shape within such close dimensional limits that any one of a million units can be picked at random and will fit into place. The use of tools has also speeded up production. This, in turn, has reduced retail prices, so that today, the mechanical luxuries of life are within the reach of the average working citizen. In all seriousness, the Tool Engineer is like a magician who works for the benefit of all mankind.

Now, to what extent have production tools been developed in the aircraft industry? One may argue that, as the aeroplane is not at present within the buying range of the average citizen, the Tool Engineer has fallen short of expectations. This, of course, is not so. The evolution of the aircraft industry is following a carefully charted course, the guiding star of which is safety. Much development will have to be done before we have a fool-proof aeroplane, but much more, before we have a fool-proof populace. At the present time, it is well that aeroplanes are not sold as indiscreetly as automobiles. If they were, we humans would have to undergo a change from a surface to a burrowing animal, and dig our cities underground for safety.

In view of the relatively small production of aircraft then, it has been necessary for the aero-Tool Engineer to be guided to a great degree by economy. Some of the developments along this line are very interesting.

In the case of difficult sheet metal forms of Aluminum, and Duralumin in its soft state, the Rope Drop Hammer is one of the most economical and productive of tools. A die of zinc is cast from a plaster mold. Into this die, a quantity of molten lead is poured. Being of a lower melting point than the zinc, the lead forms a punch separate from the die. After the metal thickness of the part to be formed has been trimmed off, the punch and die are mounted in the drop hammer. The hammer itself is raised by the friction of a few coils of rope on a revolving drum. When the rope is released by the operator, the hammer descends. The operator can regulate the length of stroke at will, and can deliver a series of short, quick blows for finishing off. As a rule the lead punch becomes distorted somewhat at the beginning of a forming operation, but it's continued dropping into the zinc die brings it back into shape. This condition is rather desirable, however, as it seems to iron the metal into shape with a smaller amount of forcing, than if the operation were complete with one drop. The saving in tool costs by this method, compared with the conventional steel die is at least 75 per cent.

The rubber die is also used to great advantage. For simple forming such as the flanging of wing ribs, this type of die is ideal. It consists of a solid piece of live rubber from 3 to 4 inches thick, surrounded on all four sides by a heavy steel container. The top surface of the rubber is exposed, and on this is laid the form block and the material to be formed. Their relationship is established by locating pins. The punch is merely a flat steel plate which descends and enters the steel container, exerting a pressure on the rubber. In climbing up around the form block, the rubber forms the material to the desired shape.

This form of die can also be used for blanking operations, within certain limits of stock thickness. A steel templet or cutting plate about ⅜, or ½ inch thick is made of the desired shape. The corners or cutting edges must be clean and sharp. In operation, the punch forces the cutting plate through the material, the climbing action of the rubber carrying with it the trim, and leaving a blank similar in shape to the cutting plate. The larger the area of the rubber die, the greater number of pieces can be formed or blanked at one stroke of the press. So successful has this method become, that at least one aircraft manufacturer has installed a hydraulic press of five thousand tons pressure capacity. Quite a difference from the laborious and inaccurate hand work of a few years ago.

In cases where the rubber die is not suitable for blanking, as in steel, the templet die is used almost 100 per cent. It has been found that by using a die of one-half inch thick 4130 steel, heat treated to 180,000 lbs. per square inch, with a hardened steel punch, almost all of the steel blanking operations can be taken care of. The die blank is first heat treated, after which the desired aperture is cut. A punch guide plate is made, the punch is fitted, and the blanking die is complete. The punch is in reality, merely a templet of ⅜ inch thick tool steel, hardened and ground on the face. It is not mounted in the punch press, but is guided into the die by the guide plate. By this method the loss of time due to the warping of dies after hardening is entirely obliterated.

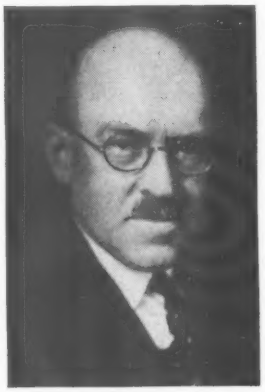
Wood is also used very extensively in the aircraft shop. Wooden dummies are made of fuselage contours and engine cowlings, so that the sheet metal parts can be fitted and trimmed to shape after being formed in the dies. Unlike the automobile, the contours of an aeroplane are not designed for beauty. The aeroplane is a thing of the air, depending entirely upon the action of the air upon its curves for its lifting power. It is vital then, that these curves be produced in metal exactly as the engineer has specified on paper, within very close limits. They should also be symmetrical from wing tip to wing tip; otherwise, the ship will have poor flying characteristics.

In order to maintain these wing curves and unbroken streamlining of the fuselage, a "Master Templet" is made of every important section. From these "Master Templets" are made sub-assembly fixtures of seasoned wood. In these fixtures the fuselage bulkheads and wing spars, etc., are assembled. All the other fittings which have to be located in a certain relationship to any of the

(Continued on Page 32)

The Tool Engineer and the WORLD HE IS MAKING

By RALPH E. FLANDERS



Ralph E. Flanders, President of Jones & Lamson Machine Company, who gave the principal address at the Annual Meeting of the A.S.T.E. and whose talk is re-printed here.

"If . . . the job . . . is a socially useful occupation, we may have confidence that the job will last as long as we are fit to hold it . . . Your city (Detroit) in the early 1900's was one of small medium sized industries . . . Now we find that this area supports many millions of people. It is tools and machines which have done this . . . let us look at the part the Tool Engineer plays in this complicated process. Until efficiency and interchangeability had been assured, the modern automobile for the enjoyment of the millions was an impossibility."

WE meet together tonight under most pleasant conditions with a good dinner tucked under our belts and our minds as free of problems and anxieties as they are likely to be at any time in the near future. The processes of digestion, assisted by the fragrance of tobacco, add a touch of philosophic calm to our mood. Philosophic calm is something that comes to us rarely. It seems to me that when it does come we should take advantage of it to look around at ourselves and our jobs, and see whether or not they are worth doing.

It is always wise to be sure of the usefulness of the work we are doing. If the job itself is not worthwhile, we may be sure that sooner or later it will disappear, no matter how conscientiously we may be working in it. If, on the other hand, it is a socially useful occupation, we may have some confidence that the job will last as long as we are fit to hold it.

But there are other reasons for examining our status from time to time. By so doing, we can accomplish other things in addition to determining whether our work is only temporary or whether it will continue for years to come. None of these things which we can discover for ourselves is more important in the long run than that we should be sure of the usefulness of our own work for the work's sake, whatever may happen to each of us personally. It says in the Scriptures that "man does not live by bread alone." If any large section of the working population were doubtful as to whether its daily work was worth while, we may be sure that this doubt would eventually express itself in terms of a sick industry and a disturbed and discouraged group of workers attached to it.

Man does not live by work alone. For his own growth and comfort, he must be convinced that the work is useful work and that he and his fellows would be missed if the work should suddenly cease.

We have both a personal and a professional interest in the job in which we are engaged. There need, therefore, be no apology for considering it together tonight.

In looking about us at the world in which we live, the first thing that strikes the thoughtful man is the elaborateness with which our life is organized. Each of us has some little segment of the world's work to do. This work we cannot do unless it is brought to us or opportunity is otherwise made for us to get to it; and in general the work itself has little connection with the food, clothing, shelter, education and amusement which is required to satisfy our needs and which we hope to obtain in return for our efforts.

Looking Back

There is perhaps no better way to bring this fact clearly before our minds than to think of this Michigan region in earlier times. My recollection of history is not good enough to carry in mind the exact details of the exploration of this peninsula by the early French missionaries and traders, but surely the number of white inhabitants 200 years ago was negligible; 300 years ago there were none.

Three hundred years ago, this lower peninsula was inhabited by some few thousands of redmen who lived by hunting, fishing, and by the crudest imaginable forms of agriculture. Trade was confined to the interchange of a few goods not easily obtainable in every location. There was a demand for flint or other hard stones for arrowheads, of shells for ornaments, and a few other simple commodities which were handed about from place to place on a barter basis.

We may imagine that this simple barbaric method of life was satisfactory to the people who lived under it. They had enough to eat, even if the variety and delicacy of the food fell short of that required by our taste. Their clothing and shelter were sufficient for their hardy con-

stitutions, even though most of us would be acutely uncomfortable if we had to live with them through the winter months. But we must remember that on this basis of hunting, simple agriculture, and rudimentary trade, only a very few people could be supported in what is now the State of Michigan. The population could never have exceeded a few thousand. More than this would have drawn too heavily on the supply of game. Larger populations were in fact prevented by the continuous inter-tribal warfare by which bands of Indians sought to protect their hunting territory from other tribes who looked at it with covetous eyes.

A New Influence

But between two and three hundred years ago a new influence came into the life of the Indians. White men came with various goods in the way of traps and guns to assist the Indian in hunting; blankets and cloth to save him the tedium of making his garments; and fire-water to give him a good time without any great amount of trouble on his part. These ready-made goods freed him from much of the work which had been required previous to the arrival of the white man, leaving his whole time available for hunting and trapping for the furs with which the new conveniences and luxuries were purchased.

But the white men, once here, kept coming in ever larger numbers. After the missionary and the trapper came the settler; and the settlement of Michigan by woodsmen and farmers is of particular interest to a native Vermonter like myself because so much of the pioneer work in this region was done by Vermonters. Vermont itself was the first frontier of the northern colonies and as soon as it became settled the pioneering spirit of the region carried tens of thousands of the citizens of my native state into this region where we are now gathered.

Life in the forest and cleared land was very simple. A few metal tools for clearing the forest and working wood, a few metal dishes for cooking, and crude spinning wheels and looms were all that were needed to make a completely self-sustaining community in the virgin forests and prairies of the new west. But these few tools, together with the skill and experience for using them, made it possible for tens or hundreds of thousands of white men to exist in increased comfort in a territory which had formerly maintained only its few thousands of red men. Tools and handicraft and skill made it possible for this territory to support a largely increased population.

Came Tools

Tools and handicrafts and machines and organization continued to grow through the decades until this city of Detroit became an attractive overgrown country town with its hundred-thousand or more population, as it was when I first saw it in the early 1900's.

Your city was then one of small and medium sized industries. Your streets were shaded with trees. The dwelling houses for the most part had good-sized yards and many of them had vegetable gardens. If I remember correctly, cows, pigs, and chickens were frequently to be seen, heard, and smelled within the city limits. The few of you whose memories of this city go back to the turn of the century will, I am sure, join me in this recollection of a quiet, beautiful little city illuminated at night by "artificial moonlight" furnished by arc lamps on lofty steel towers high above the treetops. The recollection is a most pleasant one. Tonight we meet in a city which bears little resemblance to the picturesque town of 30 or 40 years ago. That little country town has grown and grown until it stretches out along the highways in unbroken lines of buildings for 10, 20, 30 or 40 miles. It draws on subsidiary regions that extend far beyond that, with sources of materials and supporting industries dotted here and there for hundreds of miles in all directions. Its major industry, the building of automobiles, demands factories of enormous size with complicated organizations. In it, in fact, we find the maximum of size and complexity of organization. As we saw, increasing complexity of organization made it possible to support increasing populations in all the earlier stages of the history of this State and this City. So now, we find that, in this latest and fullest development, this area supports many millions of men, women, and children. It is tools, machines, and organization which have done this. Without these tools, machines, and this organization, this great region would revert to the wildness of the red men, and its inhabitants would perish in a few weeks.

World-wide Scope

If we but look at an automobile with seeing eyes, we must realize how great is the complexity of the processes by which it has been assembled and made available for our use, comfort, and pleasure. Rubber from the East Indies on the other side of the globe; wool from Utah, the Argentine, and Australia; manganese from Brazil and Russia; tungsten from China; copper from South America; these are but a few of the obvious and large-scale elements in its construction. An incalculable number of little materials and services make up the great aggregate which is placed at our disposal. There is scarcely a state or a county in the United States from which are not drawn some materials or some supply of skilled brain or hand required by the automobile industry.

These men and these materials gathered from thousands of miles away steadily progress toward this center. They stop along the way—the materials for processing, and the men for training and experience—and then move on again, their myriad lines finally focusing in some great plant in this region between Lake Huron, and Lake Erie, and Lake Michigan. And then from here goes forth a finished product—over highways, over railroads, by lake steamer, and by ocean steamship—to the far corners of this country and the world, to customers persuaded of its value, provided by their own elaborate productive organizations to pay its price, and convinced by advertising and sales effort that it is the Detroit automobile which they wish to buy.

The complication of this great machinery of production and distribution is too great for one human being ever to understand; and yet on the whole it works steadily along by the cooperative effort of all the men and women engaged in the industry.

The Role of the Tool Engineer

Let us look at the part the Tool Engineer plays in this complicated process.

The heart of this cooperative enterprise of automobile building lies in the efficient, interchangeable manufacture of the component parts which go to make up the automobile. Until efficiency and interchangeability had been assured, the modern automobile for the enjoyment of the millions was an impossibility. Your part in this achievement, now and in years past, is the very heart and soul of the development which has made the automobile the accustomed possession of the great majority of American fami-

(Continued on Page 36)

Chapter Doings

BALTIMORE

J. J. Buckley, Publicity Chairman
5303 Elsrode Ave., Baltimore, Maryland

Mr. Hallon of the Tide Water Oil Company gave a most interesting talk on the processing and uses of oils in various Industries. Following his talk Mr. Hallon presented movies of "ADMIRAL BYRD'S EXPEDITION TO THE ANTARCTIC." Outstanding points of interest in the film were the many mechanical devices used successfully on this great venture. The powerful snow tractors, the ski equipped airplanes and all the necessary tools for their maintenance all clearly demonstrated the great strides that man and machine have made in conquering those vast stretches of frozen wastes, in his search for hidden treasures.

Next of importance for the evening was the final call "All Aboard" for the Chapter's first dance which was held on the following Friday evening, March 18th.

Mr. Kost and Mr. Shealy did a splendid job of making arrangements for the dance and their efforts were well rewarded by the enthusiastic turnout of all members and their friends. A good time was had by all and many members expressed the opinion that we should have more frequent gatherings of this kind.

Mr. Voigt, Chairman of the meetings committee announced that a joint meeting with the American Society For Metals would be held on April 4th, at the Baltimore Engineers Club. Mr. Stagg of the Crucible Steel Company will speak on Tool Steels, their selection and application. His talk will be illustrated with movies titled "Steel and Tools." Refreshments will be served after the meeting.

CLEVELAND

R. B. Oswell, Chapter Publicity Chairman
1585 Hawthorne Drive, Euclid, Ohio.

Cleveland chapter held a meeting in Guild Hall, Cleveland, March 1st, Mr. Paul Zerkle, chapter chairman, presiding. Announcement was made to the effect that Mr. L. E. Trieber, of the Hercules Motors Corporation, will address the April meeting on the subject "Diesel Power." Since Mr. Trieber is one of the leading authorities on Diesel engines his talk should contain much valuable information as to the future of the Diesel engine and its effect on industry.

The annual election of chapter officers was held, which resulted as follows: Chairman, P. F. Rossbach; Secretary, H. P. Boggis; Treasurer, C. Scheihing.

American Society of Tool Engineers
Theme Song
ON WITH THE A. S. T. E.

We're engineers who answer the call
To tool the jobs both great and small,
Designing machinery and tools for the nation,
With simplified practice and standardization,
We have master mechanics and chief tool designers
And sales engineers with all their data in binders,
Our meetings instructive have proven productive,
SO ON WITH THE A. S. T. E.

A. S. T. Eer Joe Siegel is the composer of the music and words for the A. S. T. E. Theme Song, reproduced above, which was sung with great gusto by members and friends at the first Annual Dinner in Detroit. Those who may be interested in securing copies of the words and music should write to National Headquarters.

HARTFORD

Frederic L. Woodcock, Secretary
52 Imlay Street, Hartford, Conn.

A highly successful meeting was held at 8:00 P.M., Monday, February 28, 1938, at Hartford Gas Company Auditorium, Chairman A. H. d'Arcambal presiding. Various reports were read, including the Treasurer's annual accounting.

Chapter officers were nominated and unanimously elected as follows: Chairman: Irwin F. Helland, Vice Chairman: Ray H. Morris; Treasurer: Henry I. Moore; Secretary: Frederic L. Woodcock; Nominating Committee: Harry Foulker and James Skinner.

Malcolm F. Judkins, Chief Engineer of the Firthite Division of Firth Sterling Steel Company spoke on "Sintered Carbides in Tool Applications." His talk was interesting and of no little practical assistance to the larger portion of his audience. It was well illustrated by slides. The usual question period was lively

(Continued on Page 38)

Philadelphia Chapter Officers, reading left to right: Paul W. Frankfurter Sr., Edward R. Glenn, Conrad O. Hersam and William L. Battersby.

APRIL CHAPTER MEETINGS

Chapter Meeting Announcements must be received on or before the 15th of preceding month to appear on this page. Members and friends of The Society contact Chapter Secretaries for meeting details if your announcement does not appear below.

BALTIMORE

April 4, 1938—Baltimore Engineers Club, 4 West Fayette St. Meeting 7:30 P.M. Refreshments after meeting.

Speaker: Mr. Stagg of the Crucible Steel Company.

Subject: "Tool Steels, Their Selection and Application". Movies will be shown, titled "Steel and Tools".

CHICAGO

April 11, 1938—Dinner: 6:45 P.M. $1.25 per plate. Technical Session at 8:00 P.M. Machinery Club, 571 W. Washington Blvd.

Speaker: Mr. Wm. H. Oldacre, Vice-President and Manager, D. A. Stuart Company, Chicago.

Subject: "Modern Application of Cutting Fluids". Mr. Oldacre is a well qualified engineer and a very capable speaker, and we are especially grateful to him for his consent to address this meeting. The lecture will be accompanied by lantern slides illustrating the Application of Cutting Fluids.

Mail reservations to chapter Secretary, Mr. Willard T. Wilson, 7428 Euclid Avenue, Chicago, Illinois. Please reserve early.

CLEVELAND

April 12, 1938—Dinner at 6:30 P.M. at Guildhall, Prospect opposite Higbee Store. Technical Session 8:00 P.M.

Speaker: O. D. Treiber, Chief Diesel Engineer, Hercules Motor Corporation.

Reservations: Notify Henry P. Boggis, Endicott 3611 if you expect to attend. Do it early.

DETROIT

April 14, 1938—7:30 P.M. at Detroit Institute of Art Building, 5200 Woodward Avenue. No dinner, consequently there will be no charge and guests are cordially invited. Installation of officers; the showing of an industrial film, entitled "Wheels Across Africa" through the courtesy of Chrysler Corporation.

Speakers: Members of A. S. T. E. Speakers Club.

Subjects: "Industrial Relations", "The Rise of American Industry", "Service Rendered to Users by Equipment Manufacturers" and "Apprentice Training".

All members are urged to attend and give the new officers a rousing send-off, and to enjoy what promises to be a real meeting.

HARTFORD

April 25, 1938—Dinner: 6:30 P.M., City Club, Allyn and Trumbull Streets. Tickets $1.25 each. Technical Session 8:00 P.M. at Hartford Gas Company's Auditorium, Pearl Street.

Speakers: Richard L. Templin, Chief Engineer of Tests, Aluminum Company of America, John F. Coneen, Screw-machine Products Division, Aluminum Company of America.

Subjects: "Machining Aluminum". "Machining Aluminum in Automatic Machines."

Both men are well qualified to talk on this intensely interesting subject and everyone confronted with problems concerning this metal are invited to attend.

MILWAUKEE

April 14, 1938—Dinner 6:30 P.M., Republican House.

Speaker: Mr. A. H. d'Arcambal, Consulting Metallurgist, Pratt & Whitney Co., Hartford, Conn.

Subject: "The Machinability of Metals."

Please make reservations.

MINNEAPOLIS—ST. PAUL

April 15, 1938—Minnesota Union, 6:30 P.M., 65c per plate.

Speaker: Provided by the Barber Coleman Company, Rockford, Ill.

Subject: Illustrated talk on "Hobs and Hobbing Machines"

NEW YORK—NEW JERSEY

April 12, 1938—Robert Treat Hotel, Newark, N. J., Dinner at 6:30 P.M. $1.25 per plate. Meeting at 8:00 P.M.

Talking Movie, "The Main Spring", presented by the Wallace Barnes Company, Bristol, Conn.

Reservations: Call Ben C. Brosheer, Medallion 3-0700.

PITTSBURGH

April 8, 1938—Dinner, 6:30 P.M., Fillet Mignon Dinner, $1.10 per plate, McCann's Dining Room, Diamond Street, Pittsburgh. Meeting 8:00 P.M., report of Directors on Convention by J. R. Weaver.

Speaker: E. E. Griffiths, Director Time Study & Methods, Westinghouse Electric and Mfg. Co., East Pittsburgh, Pa.

Subject: "Tool Steel and Its Relation to The Manufacture and Use of Tools and Dies".

Reservations: Please make dinner reservations before noon, Friday, April 8, 1938, by calling Miss Wingard, Brandywine 1500, Ext. 9378.

Parking: Special rate for parking in MaCann's Garage, same building. Have parking Coupon stamped by cashier.

ROCHESTER

April 12, 1938—Hotel Sagamore, Rochester, 8:00 P.M.

Speaker: To be announced.

ROCKFORD

April 13, 1938—Hotel Faust, Dinner: 6:30 P.M.

Speaker: Mr. A. H. d'Arcambal, Consulting Metallurgist, Pratt & Whitney Co.

Subject: "Latest Developments in the Cutting Tool & Gage Fields." Large number of specimens and gaging equipment to be on display. A practical talk for the practical man. Discussion invited.

Reservations: Contact Geo. E. Sorensen, Jr. Woodward Governor Co. for reservations. Closing date, Wednesday, April 11th.

ST. LOUIS

April 21, 1938—Dinner 6:30 P.M. $1.00 plate, Saum Hotel—Grand Blvd. & Castleman Ave. Technical Session 8:00 P.M.

Speaker: Mr. A. E. Turner, Tapping Engineer, R. G. Haskins Co.
Subject: "Tapping Problems"

Reservations: Phone Mr. C. J. Steinman, Newstead 0800. Reserve early please.

TOLEDO

April 26, 1938—Dinner at 6:30 P.M. Toledo Yacht Club, followed by installation of officers and technical session.

Speaker: Mr. A. J. Wager, Triple Insulaire Co., Milwaukee, Wis.
Subject: "Power Factor Importance and Connection"

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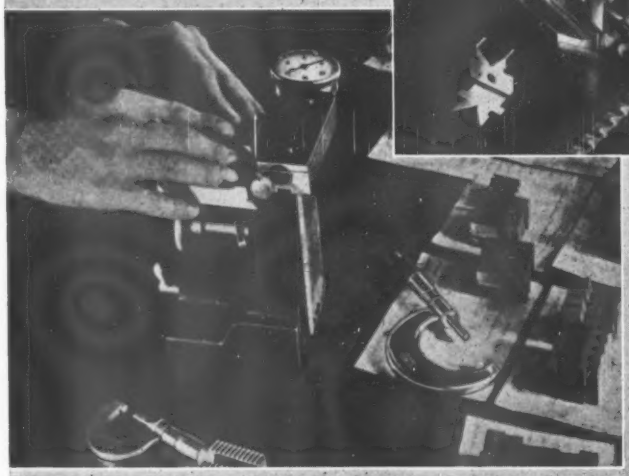
for every measuring and inspecting operation

LAST WORD Dial Indicator No. 711-F

"Handiest gage of all" in the opinion of many machinists. Sensitive, accurate, adaptable to a wide variety of operations. Gooseneck or Universal Shank for quick, easy setups.



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An especially popular number in the complete line of STARRETT Dial Indicators. Shown set up to check the setting of a Gleason Hypoid Gear Cutter. Reads in ten-thousandths with a range of .020".

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Another favorite in the Starrett Model 25 series. Shown mounted in a special fixture for production inspection of thread chasers.

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THE L. S. STARRETT CO., ATHOL, MASS., U. S. A.

World's Greatest Toolmakers—Manufacturers of Hacksaws Unexcelled—Steel Tapes, Standard for Accuracy
Dial Indicators for Every Requirement

Standardize on

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BUY THROUGH YOUR DISTRIBUTOR

Production Perspectives

NEWS OF MASS MANUFACTURING FROM EVERYWHERE

Mid-West

Caused by a **heavy drop in foreign orders** the **machine tool index dropped to 75.7 in February from 118.4 in January and 165.2 a year ago,** it was reported by the National Machine Tool Builders' Association on March 11. The foreign order index dropped to 27 in February from 75.2 in January. **Domestic orders increased 12.7 per cent in February, the index rising to 48.7 from 43.2 in January.** Foreign orders accounted for 35 per cent of the total in February against 63 per cent in January.

Roy H. Smith, vice-president **of the Lamson & Sessions Co., was elected president of the $6,500,000 bolt and nut company on March 19, and George S. Case, Sr., who has been president since 1929, became board chairman to fill the vacancy caused by the death of John G. Jennings.** Case, a graduate of Case School of Applied Science, has been president of Lamson & Sessions since 1929, following the merger of this company with the Lake Erie Bolt & Nut Co. Smith has been a vice-president of the 73-year old company since 1921, when the Falls Rivet Co. of Kent was merged into Lamson & Sessions. He is a graduate of Brown University. The company operates two plants in Cleveland, one in Kent, one in Chicago and one in Birmingham.

Elmer F. Harris, personnel director for the Mesta Machine Co., was killed when his airplane plunged to a highway shortly after he had taken off from suburban Bettis Field, Pittsburgh. He was 40 years old.

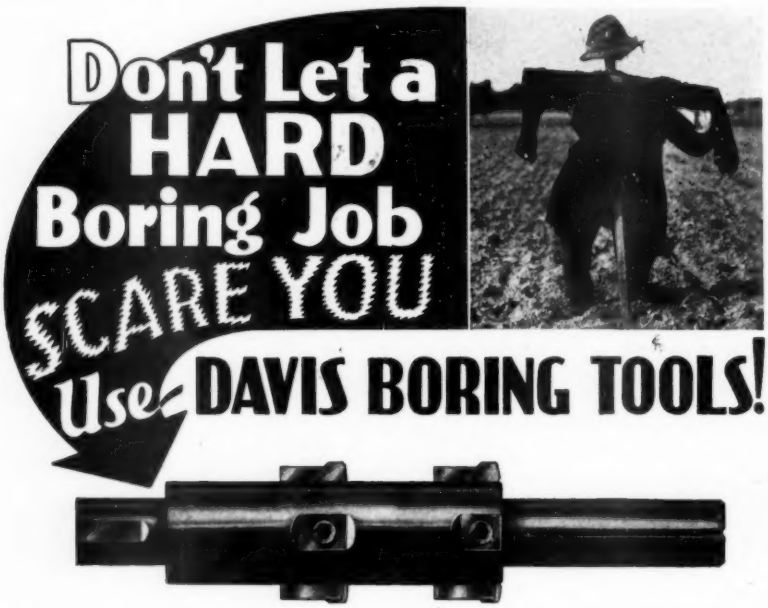
That **the country is on the threshold of the time when the man in Main Street may own a light airplane is the belief of the Taylor-Young Airplane Co.,** Alliance, Ohio. **C. G. Taylor, president,** states his company **has booked orders for 703 airplanes so far this year,** purchasers coming from many states, Canada, Europe and South America. **The light planes or flivvers of the air sell for less than $1,500,** on the installment plan, **fly 27 miles on a gallon of gasoline and can be landed against a breeze at fifteen miles an hour,** are here to stay, according to President Taylor. Five years ago his "Taylor Cub" plane was replaced by the side-by-side closed cabin plane while the steering stick was replaced with a wheel. In 1936 the company moved to Alliance, Ohio, where they were provided a large low building and airport. It is said that 1,575 flivver planes were produced in 1937.

New England

Machinery and aircraft continue to **lead all other industries in** the degree of **plant activity** maintained **in New England. A sharp increase in the volume of foreign orders for machine tools since November has been a strong factor in raising the operating level of a number of leading concerns in Western Massachusetts.** Bookings of most other types of machinery in the same period are said to have equaled or exceeded the record for the preceding year. **Backlogs thus created,** with a seasonal rise in automotive repair equipment **are expected to keep production moving briskly through the second quarter of the year,** though foreign business may not be maintained on the same level as in recent months. Aircraft plants with their heavy backlogs, are likely to operate on a capacity basis throughout the year.

The rise of automobile buying anticipated for some time past has not yet eventuated. **Word was received from Detroit recently that part of the huge program for manufacture of tools and dies for 1939 models would be released soon. Several**

(Continued on Page 20)



If you have an unusual boring job—a particularly difficult boring job—a too-high-in-cost boring job, it will pay you to find out just what specially-designed DAVIS Boring Tools can do for you.

Some of our specially-designed, single-purpose tools have saved as high as 75% in boring time, besides producing better work!

Send us prints of your work, and let our Engineering Dept. make you a specific money-saving recommendation. No obligation. Write us today!

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DAVIS BORING TOOLS

321 WAYS TO SAVE On Your Automotive Machining Costs

All of these are Proven Carboloy Tool Applications

Part	Operation	Material
AXLES, Rear:		
Bearing Retainer	Rgh. & Fin. Face—Inner & Outer Flange	Cast Iron
Pinion Bearing Flange	Ream	Bronze
Pinion Bearing Sleeve	Turn O. D.	Bronze
Pinion Lock	Face & Chamfer	Bronze
Universal Joint Ball Bushing	Turn	Bronze
Housing	Rgh., Semi & Fin. Bore; Face Flange	Malleable
BATTERIES:		
Battery Covers	C'bore, Drill, Ream	Hard Rubber
BEARINGS:		
Main & Connecting Rod Bearing Inserts	Bore, Precision Bore, Broach, Turn	Babbitt, Copper-Lead, Cadmium, Silver
BRAKE DRUMS:		
	Rgh. & Fin. Bore Brake Surface, Rgh. & Fin. Turn O. D., Groove, Face & Cham. Top, Face Bolt Circle on Back	Cast Iron, Centrifuse, Special Silicon-Copper Metal, Malleable
BRAKE DRUM HUBS:		
Front and Rear	Rgh. & Fin. Turn & Bore	Malleable, Cast Iron, Special Metals
BRAKE LININGS:		
	Drill, C'sink, C'bore	Carbon and Asbestos Compositions, Moulded Fibre
BUSHINGS, MISC.:		
	Turn, Face, Bore, Groove	Brass, Bronze, Nickel—Phosphor Bronze
CAMSHAFTS:		
	Turn, Face, Cham. All Bearing Dia. Undercut Shaft on Sides of Cam	Cast Iron, Castaloy
Bearing Caps	Turn O. D. & Bore	Cast Iron
Bearing Inserts	Turn O. D.	Special Alloy
CARBURETORS:		
Body and Parts	Drill Bore, Cham., Mill, Spotface, Ream, Turn	Aluminum, White Metal, Bronze, Cast Iron
CLUTCHES:		
Drive Plate	Turn, Face, Bore	Cast Iron
Drive Plate Center	Turn Face	Cast Iron
Friction Ring	Face	Bronze
Housing	Face Mill	Cast Iron
Plate	Bore, Spotface, Turn	Cast Iron
Pressure Plate	Rgh. & Fin. Face, Spotface	Cast Iron
Gear Bearing Adapter	Bore I. D., Face End of Flange	Cast Iron
Gear Bearing Retainer	Rgh. & Fin. Turn	Bronze
Release Bearing	Turn	Cast Iron
Throwout Collar	Face	Cast Iron
COMMUTATORS:		
General	Turn O. D.	Copper & Mica
Heater Fan Motor	Turn O. D.	Copper & Mica
CONNECTING RODS:		
Wrist Pin Hole	Precision Bore	Bronze Bushing
Crank Bearing Hole	Core Drill, Precision Bore, Ream	Steel, Babbitt
CRANKSHAFT:		
Bearing Caps	Turn, Bore, Groove	Cast Iron
Pulley	Turn, Face, Groove	Cast Iron
CYLINDER BLOCKS:		
	Rgh. & Fin. Mill Top, Bottom, Sides and Ends	Cast Iron
Cam Holes	Mill, Rgh. & Fin. Bore	Cast Iron, Babbitt
Crankholes	Mill, Rgh. & Fin. Bore	Cast Iron, Babbitt
Cylinder Bores	Semi & Fin. Bore	Cast Iron
Locating Lugs on Cylinder Banks	Broach	Cast Iron
Oil & Water Pump Holes	Bore, Face	Cast Iron
Valve Guide Holes	Rgh. & Fin. Bore	Cast Iron
Valve Seat Inserts	C'sink	Special Metal
Welch Plug Holes	Bore, Spotface	Cast Iron
CYLINDER SLEEVES: (Truck)	Bore, Face, Turn, Precision Bore	Cast Iron
Diesel Engine Blade& Miscellaneous Parts	Bore, Face, Turn	Cast Iron
DIFFERENTIAL:		
Carrier	Face, Bore, Ream, Spotface	Cast Iron
Housing	Face, Bore	Cast Iron
DISTRIBUTOR:		
Base	Turn, Bore, Face	Aluminum
Cap	Turn, Bore, Face, Mill, C'bore	Bakelite and Steel
Housing Complete	Face, Bore	Non-Metallic Composition
Rotor	Turn, Face	Brass and Non-Metallic Composition
DRIVE SHAFT: (Truck)	Turn O. D. of Flange & Face Both Sides of Flange	Steel
FIXTURES, BODY:		
Dash Control Buttons	Form	Celluloid Composition
Door Handles	Drill	Die Cast Metal
Door Plate	Drill & C'sink	Oilite Bronze
Misc. Castings	Bore	Aluminum Zinc
Rear Window Frames	Mill & Spotface	Zinc Die Cast
Window Lift Handle	Spin Edge	Brass
Sun Visors	Mill, Radii & Angles on Four Sides	Pressed Paper, (Hard Board)
FLYWHEELS:		
	Rgh. & Fin. Turn, Face, Bore, C'bore, Cham. Groove	Cast Iron & Semi-Steel
GAS LINE TUBING:	Chamfer	Rolled Steel
KNEE ACTION:		
Coiled Springs	Chamfering	Steel
Spring Seats	Burnish. Bushing in Place	Bronze
MAGNETO PART:	Form	Bakelite
MANIFOLD, EXHAUST:	Bore, Spotface, Mill	Cast Iron
MANIFOLD, INTAKE:	Bore, Spotface, Mill	Cast Iron
MUFFLERS, EXHAUST	Turn, Face, Bore	Steel
PISTONS:	Precision Bore, Face, Turn, Groove, Cham., Bore, Ream	Aluminum Alloy, Silicon-Alum. (Lo-Ex) Cast Iron, Castaloy
PISTON RINGS:	Turn, Bore, Groove, Mill	Cast Iron
PULLEYS:		
Crankshaft	Turn, Face, Groove	Cast Iron
Fan Drive	Turn, Groove, C'bore, Face	Cast Iron
Generator	Turn, Face, Groove	Cast Iron
PUMPS, OIL:		
Body	C'bore, Spotface, Ream	Cast Iron
PUMPS, WATER:		
Body	Bore, Face, Turn, Ream, Mill	Cast Iron
Bracket	Turn, Face	Cast Iron
Bushing	Turn, Face	Bronze
Impeller	Turn, Face	Cast Iron
Pulley	Turn, Face, Groove	Cast Iron
PUSH ROD GUIDES:	Bore, Face, Turn	Cast Iron
RADIATORS:		
Petcocks	Ream, Tapered Hole	Brass
SHOCK ABSORBERS:		
Bodies	Mill. Contact Faces	Malleable
SPARK PLUGS:		
Porcelain Bodies	Drill & Cham.	Porcelain, (Semi-Fired)
Wire Terminals	Cut-Off	Steel
SPEEDOMETERS:	Spotface	Aluminum
STARTERS:		
Housing	Bore, Face, Ream	Die Cast Metal
Yoke	Face	Steel
STEERING GEAR:		
Connecting Links	Burnish Ball Sockets	Steel
Housing	Face and Turn	Malleable Iron
Intermediate Bracket	Ream	Malleable Iron
Steer. Knuckle Support Assy.	Bore	Bronze
Steering Spindle Bushings	Burnish I. D. to Size	Bronze
STEERING WHEELS:	Bore, C'bore, Face, Groove, Face, Form, Trim	Hard Rubber
TAPPETS, VALVE:	Drill, Ream, Turn, Form	Cast Iron
TIMING:		
Gears, Large	Turn, Face	Textolite
Gears, Small	Turn, Face, Cham.	Cast Iron, Steel
Sprockets	Bore, Face, Turn, Cham.	Cast Iron
TRANSMISSION:		
Clutch Gear Brg. Retainer	Finish Turn	Cast Iron
Gear Bearing Retainers	Turn, Face, Bore	Bronze & Cast Iron
Gear Assembly Bushing	Precision Bore	Bronze
Case	Bore, Face, Turn, Mill, Spotface	Cast Iron
Main Shaft	Face to Length	Steel
Rear Bearing	Fin. Turn Spherical Rad.	Cast Iron
Synchronizing Clutch Assy.	Bore Taper	Bronze
Synchronizing Core	Turn, Face, Bore	Bronze
Synchronizer Drum Assy.	Turn in Place	Bronze
Synchronizer Clutch Drum	Turn I. D.	Bronze
UNIVERSAL JOINT TORQUE BALL:	Fin. Turn Spherical Rad.	Bronze
VALVE GUIDES:	Rgh. & Fin. Broach Face & Trench of Split Halves, Turn O. D. Groove, Cham.	
VALVE STEMS:	Turn, Form, Groove, Cham.	Silchrome Steel with Stellite Facing—Steel
WHEEL HUBS:	Bore, Face, Turn	Malleable Iron, Special Copper, Silicon Alloy
WINDOW GLASS: (Shatterproof)	Drill Holes	Glass
WIRING TERMINALS:	Form Turn	Brass
YOKE, GENERAL:	Face Ends	Steel

CARBOLOY COMPANY, INC.

2987 East Jefferson Avenue, Detroit, Michigan

CHICAGO • CLEVELAND • NEWARK • PHILADELPHIA • PITTSBURGH • STAMFORD, CONN. • WORCESTER, MASS.

Canadian Distributor: Canadian General Electric Company, Ltd., Toronto

MORE IMPORTANT TO YOU NOW THAN EVER BEFORE

CARBOLOY

REG. U. S. PAT. OFF.

CEMENTED CARBIDE TOOLS

Carboloy Co., Inc., 2983 **E. Jefferson, Detroit, Mich.**
Without obligation, furnish data on Carboloy tools for the following machining operations:

_____

Name_____ Title_____

Company_____

City_____ State_____

Production Perspectives

(Continued from Page 18)

large concerns are bringing out speedier models of machine tools. A mild increase of orders for replacement parts from automative wholesalers is reported this month.

United American Bosch Corporation of Springfield, Mass., with departments running from three to four days a week **has started to recall employees.** Automotive radio and Diesel engine equipment had been generally affected by the business setback. The market for water heaters is showing a little more life.

Westinghouse Electric & Manufacturing Company **of Springfield** has **reopened its refrigerator department on a weekly production** basis of approximately 40 per cent of that of one year ago. The fan department is running on about the same level. Vacuum cleaners are moving very slowly.

Gilbert & Barker Manufacturing Company of **West Springfield continues to run from four to five days a week** in its various departments with no indications of an early increase, though **orders are** said to have **shown a slight improvement.**

The **Millers Falls** Company of Greenfield, Mass., **has stepped up** its **work from four to five days as a result of a moderate improvement of orders.** This has enabled the management to bring back some of its workers who were laid off some time ago. The company has further increased its line of high-grade tools, one of which won a prize from the Associated Industries of Massachusetts last year. Screwdrivers and a bit brace are being put out in style and finish to match the plane previously introduced.

Manufacture of firearms and related activities constitute a busy field of factory operation at present, according to current reports from various lines of industry. The **United States Armory at Springfield has maintained and increased its volume since the first of the year,** with the engineering and tool making departments especially busy. Because of this condition the Armory has been enabled to take on some men laid off by private establishments in the recent past. Redesigning of tools for more efficient production of the new semiautomatic rifle and the making of new tools for machine guns are reported as featuring current activities.

Operations at the Chicopee Falls, Mass., plant of the Westinghouse Company are reported as holding practically steady with about 600 persons employed. Production is said to include considerable radio work for the Government, as well as manufacture of cabinets for cooling equipment and miscellaneous activities.

Most of the departments at **Indian Motorcycle Company, Springfield,** have been **stepped up to 40 hours a week,** and those still on 35 hours are expected to return to the normal schedule soon, plant officials report. About 380 are employed at present, and with a seasonal rise of production due and a number of sizeable orders near the closing stage, prospects seem good for continued gains at this establishment.

Norton Co. of Worcester, Mass., **announces a new product being added to its line of grinding machines, a 25 ton grinding machine for production of Diesel, truck, tractor and marine engine crankshafts.** The standard machines have not been large enough to turn out automatically many of these crankshafts. The new product is a machine, 37½ feet long and 11 feet wide, which will take a crankshaft up to 10 feet in length and automatically turn out a shaft.

Standard Electric Time Company, Springfield, **is reported to have had encouraging results from a new line of equipment designed especially**

(Continued on Page 26)

Less Breakage
PAT. PEND.
WELDON
CUPPED-END
END-MILL
ORDINARY
END-MILL
DESIGN
Weldon cupped-end mills are stronger because of
1. Stronger End Teeth—No weakening nicks at base of teeth.
2. No Pockets in Which Chips Can Clog, thus permitting faster feeds.
3. Formed Flute Construction—Adds greater strength, yet provides adequate chip clearance.
4. Controlled Heat Treatment—Latest equipment and complete control of each hardening operation assures superior performance.
Less Breakage—
We Can Prove It!
The
WELDON
TOOL CO.
3000 WOODHILL RD.
CLEVELAND • OHIO

BUY BARBER-COLMAN GROUND HOBS *for Economy*

Backed by Experience

The Barber-Colman name etched on a ground hob represents comprehensive experience with hobs and hobbing long before the first ground hob was produced—pioneer experience in applying grinding to formation of hob teeth—more experience gained in continuous research, developing special machines and methods—years of experience in producing ground hobs on a high-production basis. With long experience comes seasoned judgment; a knowledge of how, when, and why to use ground hobs for maximum effectiveness. The combination of Barber-Colman experience and judgment creates the finest ground hobs it is possible to produce . . . which means maximum accuracy and service with economy.

BARBER B-C COLMAN

PRODUCTS

MILLING CUTTERS, HOBS, HOBBING MACHINES, HOB SHARPENING MACHINES, REAMERS, REAMER SHARPENING MACHINES, SPECIAL TOOLS

BARBER-COLMAN COMPANY

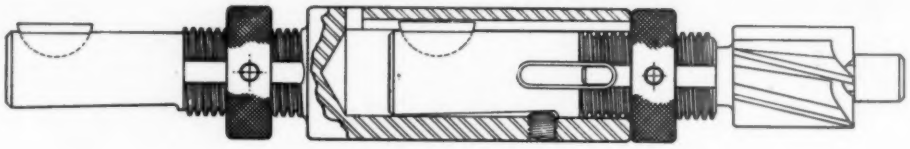
General Offices and Plant ROCKFORD, ILLINOIS, U. S. A.

CLEVELAND, OHIO
Barber-Colman Company
3030 Euclid Avenue

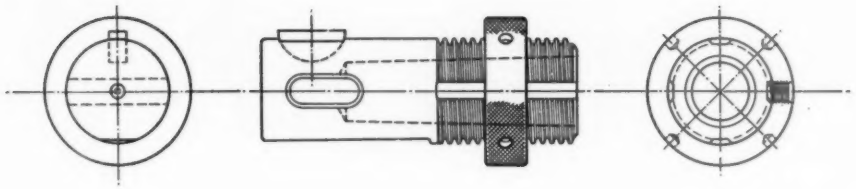
DETROIT, MICHIGAN
Hodges Machinery Company
544 New Center Building

MILWAUKEE, WISCONSIN
Dumser & Schroeder
610 West Michigan St.

Adjustable Adapter Assemblies, Manufactured by Scully-Jones and Company, Chicago, Ill.



ADJUSTABLE EXTENSION ASSEMBLIES STYLE "D"



THE Scully-Jones Adjustable Adapter Assembly illustrated on this month's front cover is only one of a great number of Standard High Speed Production tools manufactured by The Scully-Jones and Company, at 1901 South Rockwell Street, in Chicago, Illinois.

The purpose of this Adapter is to permit a quick adjustment of the tool without disturbing the entire set-up. By releasing the screw in the side of the spindle and the screw in the Adjusting Nut, the projection can be either shortened or lengthened by turning the nut. The screw in the side of the spindle retains the Adapter in position, and the key furnishes the drive for the Adapter.

These Adapters are furnished standard with both "Acme" and the Scully-Jones national standard "V" thread.

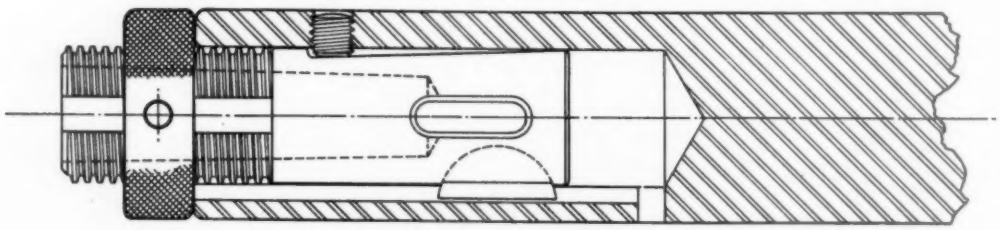
The "V" thread Adapters are furnished standard in ½" and ⅝" diameters as well as the larger sizes. The thread is ground on the diameter thus furnishing a bearing the full length of the Adapter.

In order to stimulate a wide range of use for this particular type of tool The Scully-Jones and Company has standardized on many designs such as Morse taper hole, Standard Stub Taper and the well-known "Use-Em-Up" hole. The latter having been recently improved, insuring a minimum of run out. The American Standards Association (A.S.A.) Self-Holding Taper is also included in the list.

In fact the Adjustable Adapters have become so generally used that tools are now made with this type of shank and it is a common practice to build Extensions. Extension Sockets, Spindles, Floating Holders, Reamers, Counterbores, etc., having an Adjustable Adapter Shank, permitting an adjustment on the extension.

These standard Adapters are shown in the Scully-Jones new No. 400 Engineering Manual, which will be off the press about the 15th of April.

If you will send your blue prints or sketches covering special Adapters to the Engineering Department at the Chicago Office, 1901 South Rockwell Street, Engineering Assistance and quotations will be furnished without obligations.



ADJUSTABLE ADAPTER ASSEMBLY SHOWN IN POSITION IN A MULTIPLE SPINDLE

ENGINEERED PRODUCTION
EXAMPLES FROM THE SUNDSTRAND FILES
No. 3809
Lathes
Milling Machines
Tool Grinders
Centering Machines
Balancing Tools

Satisfactory Service By Sundstrand Promotes New Production Improvement

It was a matter of new equipment for machining automobile steering gear parts. Specifically, lathes for turning worm blanks shown in Fig. 1. Operations

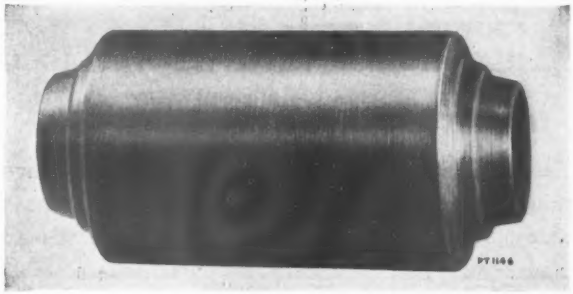


Fig. 1 — Worm blank with ends formed and middle turned ready for grinding.

are simple, merely form ends and rough turn middle prior to grinding. Ends are held to .002″, however.

Similar operations performed by Sundstrand equipment previously installed were found to be eminently satisfactory. Result, a request for estimates on the new work—and installation of several

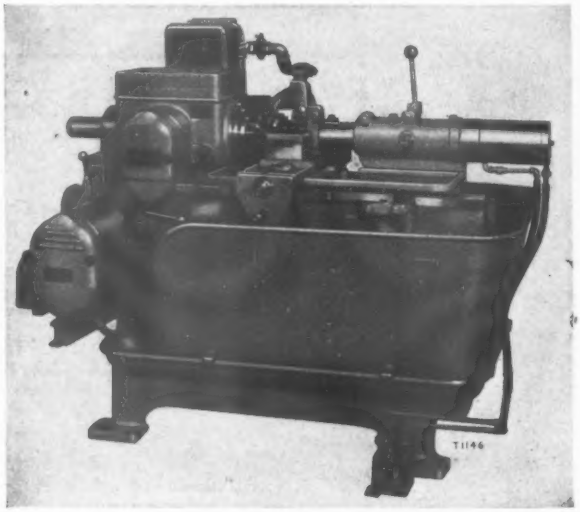


Fig. 2 — Sundstrand Automatic Stub Lathe, with pneumatic tailstock, for turning and forming steering-gear worm blanks.

Sundstrand Automatic Stub Lathes like the one shown in Fig. 2. These have new simplicity of set-up, easily established automatic operating cycle, rapid traverse of 250″ a minute, many other new features and advantages which provide new production improvements. In addition, these particular machines have foot-controlled pneumatic tailstocks

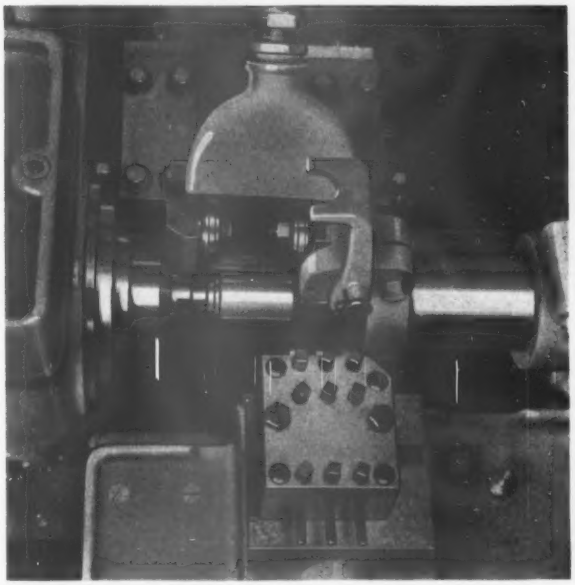


Fig. 3 — Close-up showing 3 front turning tools, 2 rear forming tools, and pivoted work-stripping device on tailstock.

which press the blanks onto the arbor as they advance to provide outboard support during turning. A pivoted member, mounted on the tailspindle, slides the work-piece off the arbor as the tailspindle is retracted when turning is completed. The combination of high-speed automatic operation and easy work-handling gives maximum production with accuracy and economy in this instance as it has in many others. Investigate! See what Sundstrand Engineered Production can do for you.

SUNDSTRAND MACHINE TOOL CO.
2532 Eleventh Street, ROCKFORD, ILLINOIS, U. S. A.

RIGIDMILS - STUB LATHES
Tool Grinders - Drilling and Centering Machines
Hydraulic Operating Equipment - Special Machinery

First Annual Convention Dinner, American Society of Tool Engineers

A.S.T.E. ANNUAL MEETING and S

CERTAINLY no one who visited Detroit's Convention Hall, March 9th to 12th, or any of the technical sessions and meetings of the A.S.T.E. First Annual Convention would have found any confirmation that industry today is at a low ebb. With trainloads of Tool Engineers coming from all sections of the country and with three of Detroit's hotels filled to overflowing capacity, and interest and enthusiasm expressed by the Tool Engineers themselves, as well as the more than one hundred and sixty exhibitors at the Machine and Tool Progress Exhibition, there can be little doubt but that the whole event was a huge success.

The Machine and Tool Progress Exhibition sponsored by the American Society of Tool Engineers has been termed by those who know, the most successful industrial exhibition in many years. Launched and staged in the middle of a "recession," with only a little more than two month's promotion, the exhibition packed Convention Hall with production men from all over the country for four days, and resulted in a phenomenal amount of business and prospects for business, reported by the exhibitors. According to Ford R. Lamb, Executive Secretary of A.S.T.E., less than one thousand of the attendance at the show could be classified as "general public" out of a total of 23,755. So large were the crowds attending that they rivaled the annual automobile show —at times it was impossible to register the visitors or collect passes fast enough at the entrance, which would indicate that total attendance even exceeded the above figure.

Annual Meeting

Wednesday, March 9th, was the first day of the activities. The opening dinner Wednesday night, with the Detroit Chapter of A.S.T.E. acting as host, was attended by some thirteen hundred members and guests, many of whom remained for the technical session. This session was on the subject of surface finishes, with a paper by Dr. E. J. Abbott, President, Physicist's Research Corp., Ann Arbor, Michigan, and discussions by Harry T. Woolson, Executive Engineer, Chrysler Corp., R. V. Hutchinson of the Olds Motor Works, and F. J. Malone of Hercules Motor Company.

Each day tours were arranged for visitors to all major production plants in the Detroit area, and about eleven hundred of the visitors availed themselves of the opportunity to see some of the largest mass manufacturing plants in the world. At times as many as six buses left the doors of Convention Hall at one time carrying A.S.T.E'ers and their friends to the various plants.

Thursday night's technical session dealt with the topic of "Selecting and Buying Equipment," pre-

Highlights of the A and To

1. **Total attendance—registered 23,755.**
2. **Number of exhibitors—162**
3. **Approximate value of exhibits—$1,000,000.**
4. **Annual Dinner attendance—in excess of 500.**
5. **"Smorgardsbord" opening dinner attendance—1300.**
6. **Special trains and special cars with special diners carried Tool Engineers to Detroit from all important industrial centers.**
7. **Due to the large number of operating exhibits Convention Hall had to run in two additional electric power lines to carry the largest electrical load ever demanded in this exhibition hall.**

...gineers. Statler Hotel, Detroit, Mich., March 11, 1938.

...d SHOW PROVE HUGE SUCCESS

sented in a paper by Edwin Johnson, Packard Motor Car Company, with discussions by P. W. Brown of the Wright Aeronautical Corporation, Tom Higgins, General Electric Company, and A. H. d'Arcambal, Pratt & Whitney Company.

Annual Dinner

The annual banquet was held Friday evening with more than five hundred members and guests attending. This, the gala occasion of the annual meeting had as the featured speaker, Ralph E. Flanders, President, Jones and Lamson Machine Company, and past president, National Machine Tool Builders Association, whose interesting and inspired address is reprinted elsewhere in this issue.

On this occasion the newly elected 1938-39 naticnal officers of The Society were installed. President for the coming year is Walter F. Wagner, Master Mechanic of the Lincoln Motor Car Company. First Vice President is James R. Weaver, Director of Equipment, Inspection and Tests, Westinghouse Electric and Manufacturing Company. Second Vice President is George A. Smart, Tool Supervisor, Allis-Chalmers Company, with Charles F. Staples of the Giern-Anholtt Company, as Secretary. Frank R. Crone of Lincoln Motor Company was re-elected as Treasurer of The Society for 1938-39. Ford R. Lamb, Executive Secretary of the A.S.T.E. Photographs, as well as an introduction to these officers, will be found on another page in this issue.

Board of Directors Meeting

The Annual Meeting of the Board of Directors was very well attended, with nearly all Directors and Chapter Chairmen who are Board Members Ex Officio, attending.

The Board of Directors meeting was held at the Fort Shelby Hotel, Detroit. Projected by The Society as a result of the Annual Meeting, and with the approval of the Board of Directors, were:

1. A semi-annual meeting to be held in October at some A.S.T.E. Chapter town yet to be selected. The semi-annual meeting to include technical sessions, directors' meeting, and open house at plants of industry in the town selected.

2. Company memberships of an affiliate nature were approved with annual dues of $25. The affiliate membership to entitle the company to one official company representative on the membership rolls.

3. Decision to rebate A.S.T.E. members who visited the show one cent a mile based on the distance between Detroit and headquarters of the chapter to which the member belongs.

4. Plans for chartering of several new chapters are under way as the result of a flood of applications for membership from towns where there are no A.S.T.E. chapters as yet.

...he Annual Meeting ...Tool Show

8. "Father" of the show is James R. Weaver, Chairman of the Program Committee and newly elected Vice President of A.S.T.E. for 1938-39.

9. All arrangements for the annual meeting and Machine & Tool Progress Exhibition were handled by the Society staff under the supervision of Ford R. Lamb, Executive Secretary.

10. Many old acquaintances were renewed among Tool Engineers who had known each other "way back when" and had drifted apart to distant cities to be drawn together again in Detroit and joined in the instructional and social amenities of the occasion.

Production Perspectives

(Continued from Page 20)

for the use of utility companies, and also having industrial applications. The device is directed to a more accurate and dependable system of meter readings, by which seller and purchaser of electric energy may be protected against interferences or variations from correct standards.

A new low point in the business recession was reached in Western Massachusetts in February according to figures on employment in the metal trade industries released by A. R. Tulloch, secretary-treasurer of the Employers' Association of Western Massachusetts, Inc., and secretary of the Western Massachusetts branch of the National Metal Trades Association. Mr. Tulloch's figures show a total employment in these industries of 15,737, a drop of more than 1,500 from the previous month. The January total reached 17,127 and the month before that the employment figures were 18,930.

Officers and employees of the Norton Co., Worcester, paid tribute recently to Charles L. Allen, chairman of the board of directors on his 80th birthday. Officers of the company presented him with a bronze plaque, commemorating the anniversary, and reproductions of the plaque are being prepared for distribution to employees.

Robert Shirley, former works manager of the **Chapman Valve** Manufacturing Company, **died in Springfield Hospital** recently.

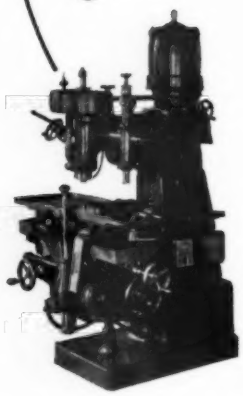
Iver Johnson, 48, **president and treasurer of the Commonwealth Screw Company, Worcester, and prominent Mason, died in Memorial Hospital** recently after a week's illness.

Ralph E. Flanders, president of the Jones & Lamson Machine Co. and Bryant Chucking Grinder Co. of Springfield, Vt., has been elected a director of the National Shawmut Bank, Boston.

Weekly average payrolls in Bridgeport, largest of Connecticut's industrial cities, **showed a very slight gain in February, two-tenths of one per cent over January,** according to the Chamber of Commerce survey. The February figure, $920,794, was 20.59 per cent lower than February of last year, however. At the bottom of the depression, Bridgeport's average weekly payroll was in the neighborhood of $600,000. The 1937 peak was higher than that of 1929 . . . **The Bullard Co., Bridgeport, reports its backlog of orders in January this year was 135 per cent greater than in January, 1937.** January and February orders lagged, however. **Current inquiries, it is stated, indicate a substantial potential demand. . . . Niles-Bement-Pond Co., Hartford, had a January backlog estimated at 50 per cent more than that of the same month in 1937. . . . Sharp expansion of operations by A. C. Gilbert Co., New Haven, is indicated by that company's purchase of American Flyer Co., Chicago.** Twenty-five carloads of equipment are being shipped from Chicago to New Haven. The Gilbert company already manufactures a broad line of toys, hobby equipment and electrical appliances. Purchase of the Chicago concern adds miniature railways and equipment to the Gilbert lines. A large addition has recently been completed at the plant. . . . **George W. Fleming Mfg. Co., a new corporation, is preparing to open a factory in Plantsville, Conn., to produce mechanical tools and equipment for automotive, aviation and other manufacturing enterprises. George W. Fleming,** head of the new company, was **formerly president of the Fleming Machine** Co., Bridgeport, **which was sold to the Black & Decker Mfg. Co.,** Balti-

(Continued on Page 34)

GORTONS and ALLEN-BRADLEY MOTOR CONTROL



The most intricate patterns can be reproduced faithfully on Gorton Duplicators to tolerances as close as practical for mold work (.001" and closer).

While working to achieve the utmost simplicity in their powerful Bulletin 709 Automatic Solenoid Starters, Allen-Bradley Co. also simplified their tool room work with Gorton Duplicators. The original molds for the 4-pole cross bars and thermal relay blocks above were cut to dimensions on the Duplicator with milling cutters. All duplicate and multiple cavity molds are produced with the duplicating attachments.

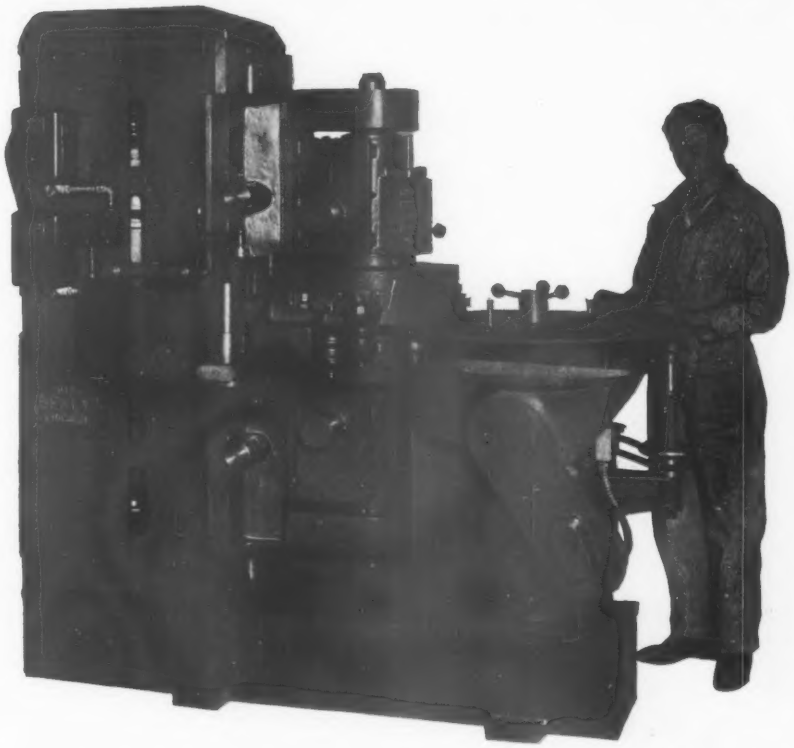
Mold costs have been so much reduced by Gortons that it pays now to have several identical molds on hand. This saves in molding operations and prevents any chance of holding up production of plastic parts for lack of molds to work with.

GEORGE GORTON MACHINE CO.
1111 13TH ST., RACINE, WIS.

Another Advance in the ART of GRINDING

FROM THE HOUSE OF

BESLY



PHOTOGRAPH shows new Double Vertical Spindle Besly Grinder with Rotary Feeding Fixture arranged for grinding coil springs. Production 1000 to 6000 springs ground per hour per operator. Heretofore unheard of accuracy as regards to length and angularity. Operator simply drops springs in holes in Feed Wheel. After passing through grinding zone springs drop out into suitable receptacle. ● These machines made to carry grinding members from 12″ to 36″ diameter. Always equipped with the Famous Besly Titan Steelbac Abrasive Discs, 1″, 2″ or 3″ thick. This method of Besly Grinding lends itself to surfacing such articles as thrust washers, piston pins, carbon discs, piston rings, wrenches, clutch facings and most jobs previously performed on the conventional Double Spindle Disc Grinder. Built also with only one head served by Rotary Fixture for grinding work with one surface to be finished. ● If you have parts that you think might be Besly ground to advantage, send us samples or prints and we will give you the benefit of our forty-five years disc grinding experience.

Write for your copy of Booklet on Besly Titan Steelbacs.

● Do you operate a Disc, Surface or Face Grinder employing the side of a Grinding Wheel? If so, get your copy of Booklet describing Besly Titan Steelbac Abrasive Discs. Learn about these bolted-on Discs (with one, two and three inch of Resinoid Bonded Abrasive) which continue making new records against the older type of grinding member.

CHARLES H. BESLY AND COMPANY

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HANDY ANDY'S *Workshop*

Often, I grope for a start; this time, the trick is to stop. There is too much to write about for coherence; even my sleep is disturbed by visions of pumps and pump jigs, the silent power of hydraulic tools; my ears din with the hiss of pneumatic devices, the click clack of automatics, my nose tingles with the smoke of welders, my eyes—well, I see pink ash trays (and who's got a spare for this poor scribe?) and such an endless variety of good ideas that I'm as dizzy as the guy who got spun around by the roller skater at the big dinner. Oh, what a Show, what a SHOW! Gentlemen, the Committee that put that across goes, en masse, into my Hall of A.S.T.E. Fame, with a special pedestal for O. B. Jones. Look what your baby "went and done," O. B.!

Yes, gentlemen, the Show was a success, a whopping success. But let's not brag. After all, we knew it could be done, it just took guts, enthusiasm and cooperation, plus hard work, and Tool Engineers specialize in those things. Paraphrasing from the Scandinavian: "For God and the tool engineer nothing is impossible." Yet, to Ford Lamb, master showman who outdid the late Phinneas T., goes the gilt laurel. He was the mainspring, with Jim Weaver next as bull gear (don't mind mixed metaphors at a time like this) and the gang working with them like an Oxford crew. Now, weary but jubilant, they can say: "Well, gang, there's our infant prodigy!—we'll put him in long pants, eh?"

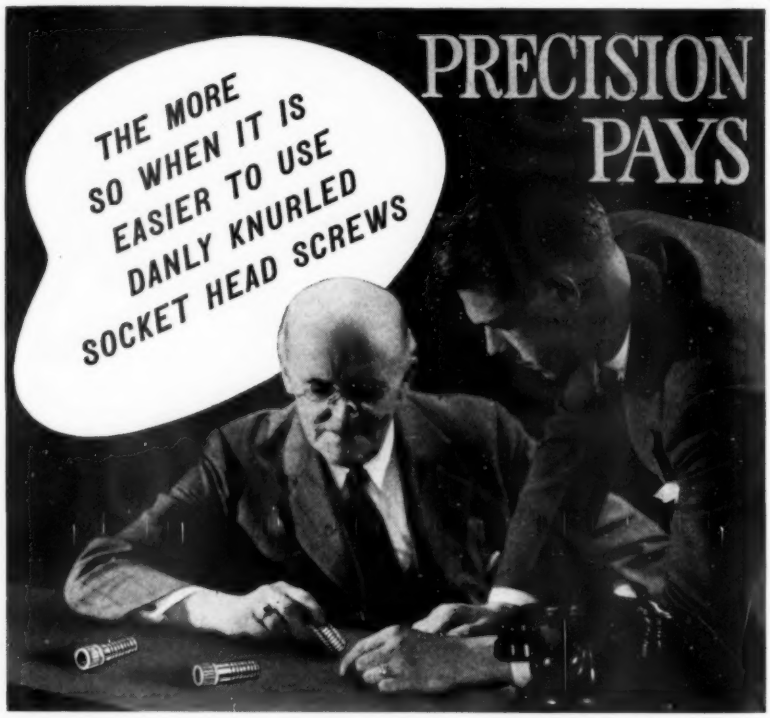
Of course, you know by now who is to sit at the officers' mess for the coming year.

Walter Wagner, Prex., is a good man at the helm, a steady hand who knows his course. He'll set a stiff pace for Jim Weaver (the guy with the winning personality from Pittsburgh) who is next in command and a 10 to 1 shot for Chief next year. Geo. Smart sits in the 2nd V.P.'s chair—and it'll take some chair—with ol' reliable Frank Crone burying his nose in the books another year. Charley Staples, veteran A.S.T.Eer who worked hard at the Tool Show, rounds out the Exec. Com'tee, as Secretary. And here, a tribute to Luke Beach, modest and quiet, who generously waived precedence to promote Wagner, and to willing, genial Ray Brunner, whose smiling face will be missed from the Board. All nice boys. We'll drink to 'em, eh?

Due to changes which preclude all but Chapter Chairman (or proxies) from the Directorate, I make my exit from the Board along with the others "at large." Now, speaking for my erstwhile fellows, let me tell you boys North, East, West, South, that they're one swell gang. Now, I'm not trying to get revenge on 'em for the panning they gave me by heaping coals of fire on their heads. I really mean it. One session at that Board, and you just know why this A.S.T.E. is going to town. There is cooperation! We missed Dickett of Rockford, whose life partner is seriously ill. We all join in wishing her restored health.

Thirteen hundred people at Wednesday night's dinner, gentlemen. Did you ever, before, hear of 1300 people at a technical dinner? Of course, there were ladies there, came to find out why their hubbies stay out late o' nights (and inciden-

(Continued on Page 30)



Danly Knurled Socket Head Cap Screws are accurate to every dimension and thread—and offer two big advantages besides.

Oily fingers don't slip on these Danly knurled head cap screws. The mechanic can drive them farther by hand before he has to use a wrench. He does it easier—he does it faster—and the saving in setup time is multiplied by the number he uses.

DANLY KNURLED HEAD CAP SCREWS

In addition to easier setting, another big feature of Danly knurled socket head cap screws is in the simple and effective method of locking them in soft or hardened metal. They're made of carefully selected screw stock that has the kind of strength that stops fracturing and mushrooming. Ask for full details.

Precision Pays—secure it by specifying Danly Knurled Socket Head Screws for your work.

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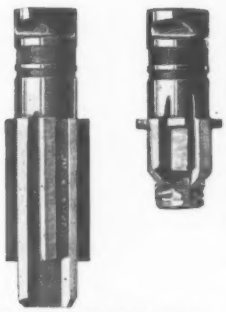
ECLIPSE ENGINEERS are daily designing new applications with the Multi-Diameter feature, so as to consolidate operations, resulting in more operations per spindle, more pieces per machine and many more pieces per cutter, all producing fundamental economies in production and overhead.

Eclipse Engineers' accumulated experience is available to you for the asking.

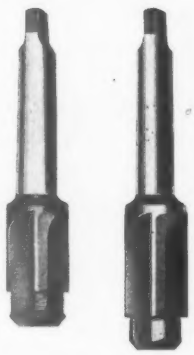
Note: Holder and cutter—finished work, on universal joint and covering—and Eclipse Multi-Diameter Cutter at left.

300 to 600% Longer Life



Eclipse Multi-Diameter Cutters New and Used Completely.

Separate diameters permit correct grinding without undercutting other diameters when sharpening—thus giving 300% to 600% longer tool life, with resultant tool economies. Compare grinding life of Eclipse type at left with that of old style "step" cutter, at right.



Step Cutter, Used Completely and new.

Do you need greater production with existing machine and space capacity?

Do you want to reduce your "per hole" costs? Consult your nearby Eclipse Office.

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tally, to see their brain children clicking and clacking around the hall) but even so, 1300 is a lot of diners. And at the big dinner Friday night some 500 paid two and a half per, and even that is a lot of people at any price. Anyway, I think we've set the record for engineering dinner gatherings.

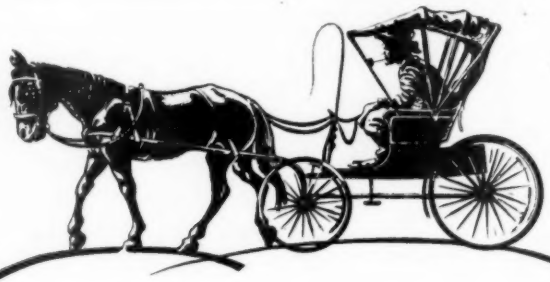
A.S.T.Eers Wise, Hewitt and Clark(son) ganged up on me just before the dinner, but Jimmy Giern rallied to my defense and that's how I got this way. You see, he took us for a cruise around the China seas, then Auge Ketelsen came along so we went for a jaunt down toward Paraguay or somewheres. Oh, they've been places, those boys. Now you know where I got my nautical terms, not that I haven't windjammed some myself. To make matters worse, Swan Bergstrom (I hear they've given him a real good job at Cinci Milling) greeted me in Gaelic, then somebody)Johnny Boe or Otto Winters) called me McRylander, so I went in and ordered fish. And that flew down from Manitoba—by airplane. I tell you, boys, this is getting more muddled every minute, like the guy who tipped a few too many while writing a prize essay. He wound up something like this (assuming a coherent start): "andd naow, dare reeadesh$, I wanna saiy thatt temmprencsh is the loqical sluzhum to our so so to (hic) soshul problelms. If we don*d zday sobm. etc ? we won'z whupee we snbj yh ugh. ?&.

Joe Siegel, (he's the guy that wrote the A.S.T.E. theme song) Ent't. Ch'man and advance agent for gourments, put on a real swell show for us, including the gal whose light fizzled at the late Stag Party. She didn't fizzle this time, although the light might 'a' stayed on a mite longer. I couldn't see very good. The gal who really took us to town was Dorothy Berlin, and I mention her for a purpose. She just played an accordion — and how! — to thunderous encores, and there came the thought that the great successes are made by people who love their work. That is why I am for Ford Lamb; he has given this A.S.T.E. the best he's got because he truly loves the work he is doing for it. No wonder they gave him an ovation! Well, that goes in all walks of life; "He that giveth his life shall have it."

You know, I'm one of these slow witted guys; I can think up the brightest answers to wisecracks—next day. Anyway, I couldn't keep up with the barrage Fri. nite, so here is for general information. Yes, I know that Frank Shuler introduced me formally at the dinner, evoking polite interest, and that it took the wooden dummy to introduce Handy Andy. Incidentally, I didn't shoot herring over in Norway, although I've seen the fjords in passing by, and they didn't have square portholes in the boat I came over on, and my accent (have I got one?) is pure Bostonese—something like Joe Whipple's, who hails from that neck o' the woods, too. By the way, A.S.T.Eer Atlas toured Scandinavia last summer, which ought to be good for a talk. Tell me about it sometime, M.A. Frank Gallant of Chi must have a swell wife; he liked me as soon as he heard my name, it being the same as her maiden name. Frank and I are fast friends now, anyway, his dad-in-law insists that I'm one of the family. Maybe so, and if so, I accept the nomination with pleasure. It's a small world, after all.

You know, my thoughts ran riot as I sat at the dinner. I made notes, knowing the while that space would forbid all but fleeting impressions as the past few years passed in review, the future rushing to meet us. Yes, in the tick of an astral clock I have seen this Society grow from a

(Continued on Page 32)



AND THEN THE NATION "miked up"!

There was no precision — as we know it now — in those days when America traveled by horse and buggy. But America was "waked up" and "Miked up" since then. Today measurements of a tenth — or even a half a tenth of a thousandth of an inch are common practice. And America is at the head of the world's industrial parade.

For over 50 years The Lufkin Rule Company has been pioneering in the development and perfection of measuring devices. That's why tool engineers, inspectors, mechanics and all users of precision tools rely on Lufkin Micrometers, Gages and other tools to assure them of accurate measurements.

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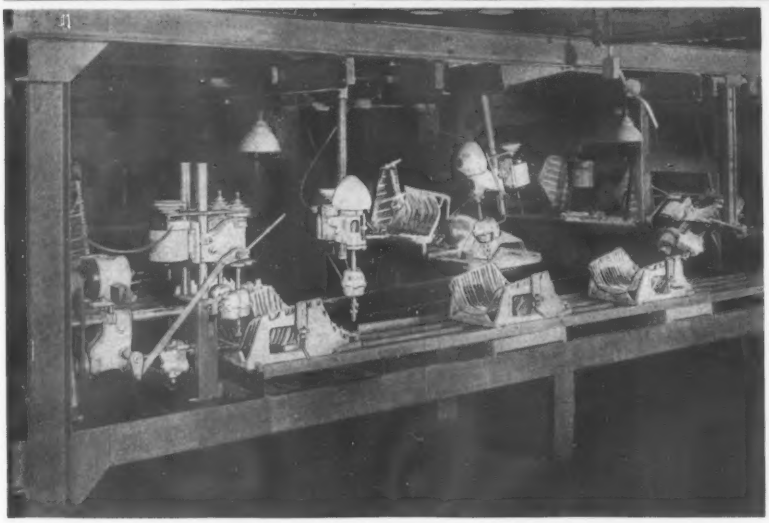

The above photo shows only one application out of dozens of similar installations of Delta drill heads. Wherever you have a tough drilling or tapping setup, wherever pieces are large and awkward to handle, wherever the cost of special machines is prohibitive—think of Delta drill heads. Their use will solve many of your headaches. Available in 11", 14" and 17" sizes.

Write for data sheets and prices.

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For Delta Drill Presses and Drill Heads

Tapping assembling and fastening holes in the die-cast radiator grilles shown in the photo was a tool-designer's headache. The pieces are large and awkward to handle, the holes must be drilled at various angles, and roll-over jigs or special machines would have been equally expensive. Note how simply the problem is solved with Delta 14" drill-press heads.

Four holes are tapped in one operation at the first station, one at a slight angle at the second station and one at an extreme angle at the third station. Minimum handling of the work; minimum tool expense; maximum output—these advantages are made possible by the use of Delta drill heads.

Delta 17-inch Drill Presses

Delta 17-inch drill presses are cutting production costs in hundreds of progressive production plants. They are low in first cost and economical in upkeep. Delta 17-inch drill press heads can be used in special setups at any angle.

Just one illustration of a combination tool using

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Rough reaming
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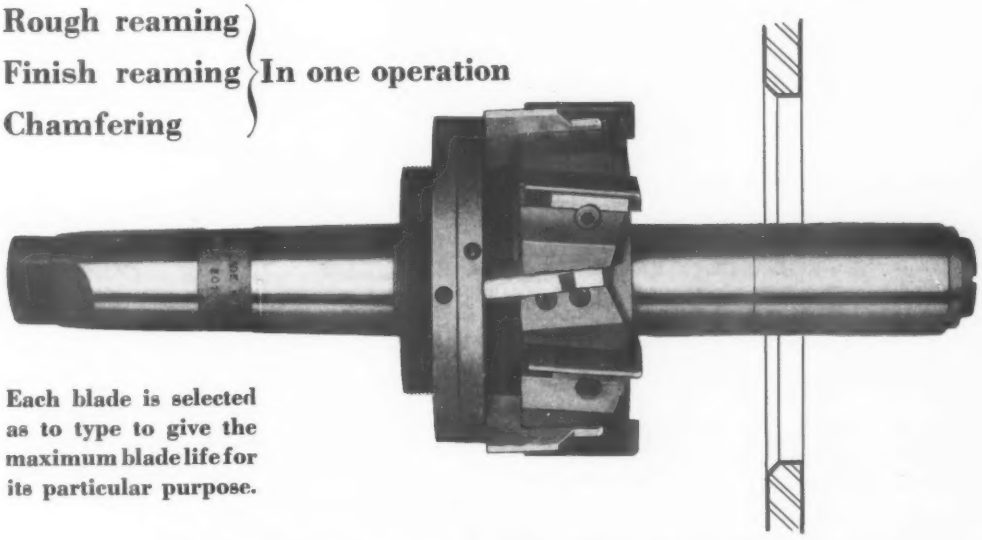

Each blade is selected as to type to give the maximum blade life for its particular purpose.

May we make a layout of a combination tool for your job?

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DETROIT

An Industry Evolves

(Continued from Page 12)

curves are also assembled with the use of the same "Master Templets." The result is, that when these sub-assemblies are passed along to the main assembly fixture they fit into place exactly. After the "Skin" is applied, an aerodynamic curve is derived that is a duplicate of what was determined in the wind tunnel, many months before.

Many aircraft fittings are made from steel, and are of welded construction. In order to maintain accuracy and inter-changeability, some very complicated welding fixtures have to be devised. The ultimate shrinkage of the metal, due to the heat of welding, has to be predetermined, and allowed for, in the fixture. The structures are merely tack welded in the fixture, then removed and completely welded. The distortion due to the heat has to be straightened by hand. In many cases the welded structure is replaced in the fixture for drilling. This saves the expense of making separate drill jigs.

Machined parts are tooled in the more or less conventional manner. Electric welding is used very extensively, however, in jig construction. After welding the jigs are normalized, then machined at the vital points.

The greatest solution to the problem of production methods in the manufacture of aircraft, lies in a closer cooperation between the Tool Engineer and the aeronautical engineer. The latter individual very often, through lack of practical experience is governed, not by shop usages, but by his ability to draw. Not until it is realized just how closely these two professions must work together will there be a large enough production or profit, to justify a more intensive development of the aeroplane. But when this co-operation grows, and the influence of mass production is felt in the price of aeroplanes we will all be able to go sky riding, and view the clouds with the sunny side up.

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Handy Andy's Workshop

(Continued from Page 30)

struggling local to a national organization; for my own part, I am grateful—and proud!—of the chance to have worked for and with this A.S.T.E. It is something to feel that one has been a part of it. Looking out over the floor, I saw happy, enthusiastic faces, saw friends, caught friendly smiles, here and there the wave of a hand; we communed in the sign language of friendship. Did you ever stop to think that each new friend, placed in a niche of his own in our hearts, never displaces another?—there is always room for more. And boys, this is a friendly Society; it's the swellest outfit on earth. With that thought, auf Wiedersehen—'til we meet again. The show must go on.

Handy Andy.

NEW WORD

Columbia University reports the coining of a new word which may come in handy to describe the public debt one of these days. The word is "googol" and represents a number beginning with 1 and followed by 100 cypers.

Special High Production Machinery, Multiple Spindle Drill Head Equipment, Fixtures and Indexes.

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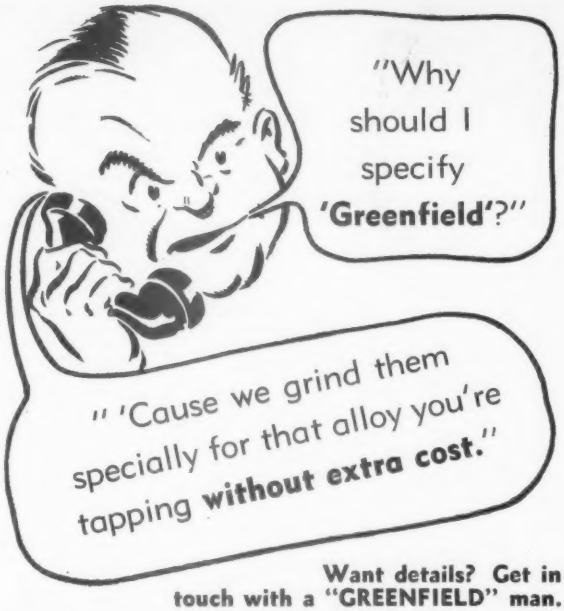

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Production Perspectives

(Continued from Page 26)

more, Md. Lately he has been consulting engineer in industrial management. . . . **Steel Fabricators, Inc., a new corporation, is equipping a section of the former Aldrich Bros. mill in Moosup, Conn., to manufacture ventilators. Victor C. Wetzel, of Providence, R. I., will be general manager. . . . M. B. Mfg. Co. has been incorporated** in New Haven to build machinery and tools in a plant at 1060 State street. **John J. Mettler is president. . . . The new $4,000,000 rolling mill of the Bridgeport Brass Co., Bridgeport, is rapidly nearing completion.** It covers a floor area of about 200,000 square feet and will be devoted to the production in sheet form of practically all the copper base alloys. . . . Industrial earnings reports in Connecticut for the calendar year 1937 have indicated great increases over the previous year, with the effect of this winter's slackening yet to be shown up. **Companies reporting marked gains in 1937 included New Britain Machine Co., Union Mfg. Co., and Fafnir Bearing Co., all of New Britain, and Colt's Patent Fire Arms Mfg. Co., Hartford. Stanley Works, New Britain, showed a slight drop in net profit.**

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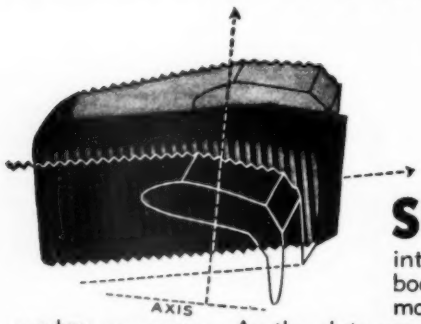

Automatic
Radial & Axial Adjustments
More Usable Blade
NO PINS, WEDGES OR SET SCREWS

SERRATED blades, tapered toward the bottom, fit into mating slots in cutter body—there held in an immovable grip without pins, wedges or screws. As the slots are on an angle to the body, when the blades are set out one or more serrations for regrinding, both radial and axial adjustments occur at the same time, **automatically.** These new face milling cutters are available for either roughing or general milling, or for finishing.

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ROUGHING FINISHING

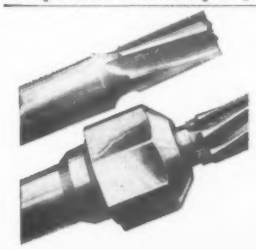
TRADE OK MARK
INSERTED-BLADE METAL CUTTING
TOOL SYSTEM

Plans for the construction of a new factory and general offices to cost approximately $500,000 have been announced by Carboloy Company, Inc., Detroit, manufacturers of cemented carbide tools and dies.

The new plant, to be located on a 40-acre tract of land on the north side of 8-Mile Road, one half mile east of Van Dyke, will be ready for occupancy in the Fall of this year. It is being designed to accommodate the entire manufacturing facilities of Carboloy plants now operated in three separate units at Cleveland, Ohio, Stamford, Connecticut, and Detroit, Michigan.

The manufacturing plant is to be a one story building with an area of about 100,000 square feet. According to W. G. Robbins, President of Carboloy Company, approximately 500 persons are employed when the organization—a subsidiary of General Electric Company—is operating at full capacity.

The R and M Manufacturing Company will occupy a new plant at Royal Oak, Michigan on April 1. Seventy-five hundred square feet will devoted to the manufacturing of precision gages. The most modern facilities will make working conditions ideal. A color scheme of aluminum and white provides a maximum natural lighting reflection. All equipment is individually motor driven which eliminates all overhead driving, belting and pullies. No expense, has been spared, it is stated, in the construction of an efficient and modern constant temperature room which will be used for lapping and inspecting purposes. The walls and ceilings are of solid block cork. The floor is made of alternate layers of concrete and cork, which construction not only provides perfect temperature insullation, but also absorbs all extraneous vibration that might influence the very sensitive and accurate measuring equipment. This room is artifically lighted and a modern air conditioning system maintains a constant temperature of sixty-eight degrees.



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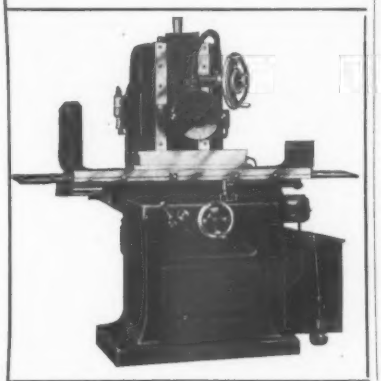

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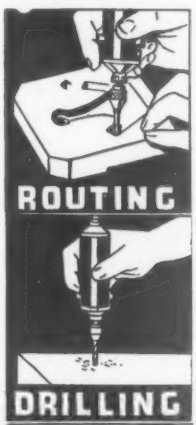
Moto-Tool—using over 200 different, instantly interchangeable accessories—is ready to do scores of jobs in your plant quicker, better, and easier than they have ever been done before. It grinds, drills, routs, carves, cuts, etc., ON ALL MATERIALS—proves invaluable on many difficult-to-get-at repair jobs. Grueling power work or delicate precision operations are all alike to this versatile machine. It runs all day without heating up.



Moto-Tool can be used any place. It plugs in any light socket—runs on A.C. or D.C. current. Weighing only 13 oz. it handles lightly, easily. Anyone can operate it. Its many construction refinements make Moto-Tool preferred by engineers everywhere. They appreciate that it is the top tool of its class on the market. There are thousands in use.

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The Tool Engineer's World

(Continued from Page 14)

lies. Your contribution has not been a small one.

Machine designers and builders have furnished the machines, oftentimes in collaboration with you gentlemen who sit before me. The automobile designers have labored diligently through years of growing experience to design the parts and to make them of the most economical and serviceable material. It has been your specific task to fit the machines to the performance of the work to be done. You have had not merely to furnish the equipment required, but you have also in many cases devised the processes and, as a result of this skill and experience, have been effective in improving the design of the parts you are making. Day by day, month after month, year after year, your contributions have steadily brought the automobile within the reach of more and more millions of your fellow-citizens. Many other groups have had a share in this process, but your share has been at the very heart and center of the undertaking.

The Reward

For this important work you have had some reward. Some of it has been the material reward of salary paid for services rendered. For most of you there has been as well the further reward of the privilege of exercising your faculties in a position of major importance in carrying forward the greatest experiment that the human race has ever undertaken. When we look over the history of this state of Michigan, as we have been doing so briefly and so sketchily tonight, we get some conception of what the nature of that experiment has been in this region.

The nature of the enterprise is this—to see whether by greater and greater cooperation, and greater and greater complexity of organization, it may not be possible to furnish more and more millions of people with more and more necessities, comforts and luxuries, and with opportunities for enjoying the higher things of life. As we have seen, this process is dependent upon complexity of organization and a high degree of cooperation. That complexity and that cooperation are so involved that we can hardly view the process without amazement as to how it can be successfully carried on. And yet, carried on it is for long periods of time. That it breaks down from time to time is not astonishing. Our astonishment should be that it can be made to work at all.

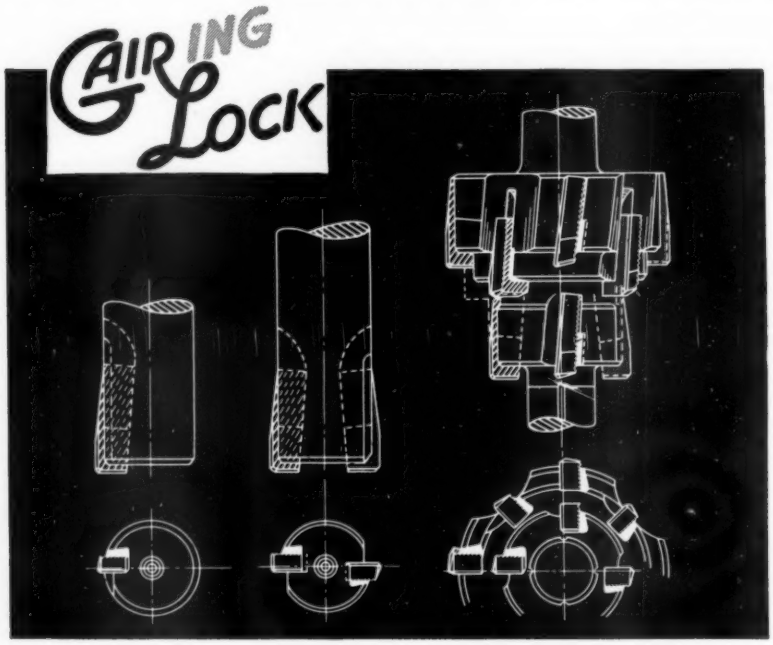
As workers at the heart and center of this great enterprise, we have certain privileges and responsibilities. It is required that we put forward our best technical skill and experience for application to the task at hand. Without this, further progress is impossible. We know well that the recent social advances which we have made, or have attempted to make, such as general shorter hours and a generally higher standard of living, are mere words written with fading ink on decaying paper unless and until we have made them indelible by further progress in our chosen work.

Now—a Further Duty

And as citizens we have the additional duty of understanding—so far as we can—the social and political movements which will further this experiment in which we are engaged, instead of retarding or destroying it. It is not my plan here tonight to suggest to you in detail what is right and what is wrong with the legislation and administration of public affairs in the past few years. That there has been much that was right, and that there has been much that was wrong, is I am sure, clear to all of us. My only point is that you and I, because of our positions, have a particular duty to manifest, so far as we can, clearness of thinking and acting in the political field.

Finally, so far as our personal fortunes are concerned, it is right that our broad conception of the relationship in which we stand to an industrial civilization should give us

(Continued on Page 38)



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Ask for Bulletin 404.

The Gairing Tool Co., Detroit, Mich.

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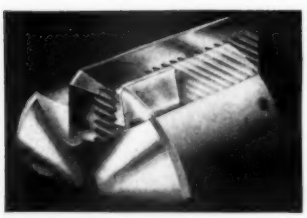
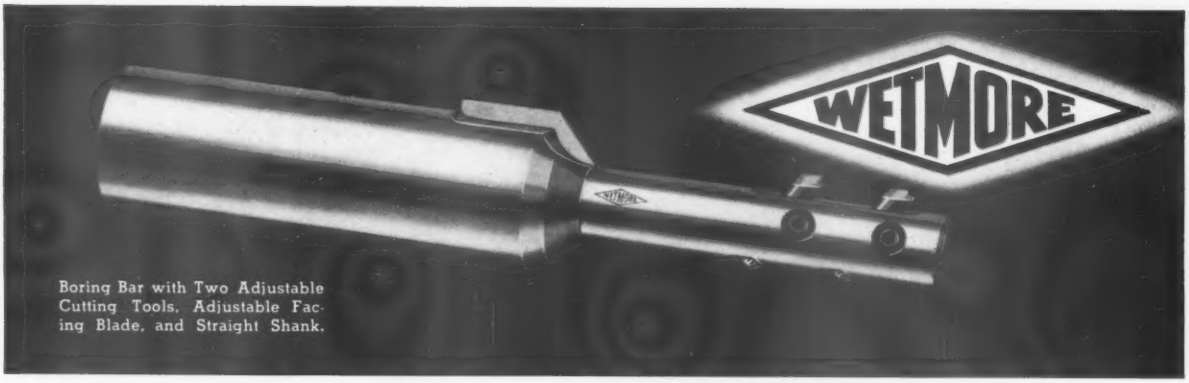


Blade GAIR-LOCKED in position in cutter head. Patent pending.

ANOTHER WETMORE BORING BAR THAT CUTS TIME AND COSTS



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self-respect. It is right that we should see the value of our own work with clear eyes, neither exaggerating it by conceit, nor deprecating it with false humility. It is right that we should act by all wise means to be paid as nearly the full value of our services as we can manage to obtain, keeping continually in mind the services, large and small, rendered by all the other elements in the complex organizations of which we are members.

Above all, we must keep in the forefront of our mind and describe persuasively to all of our friends and associates this close relationship which we have seen between the high standard of living for great numbers of people on the one hand and complex smooth-working industrial organization on the other. We can make no advances by any means which destroys the social organization. With the social organization gone, this City of Detroit, and this State of Michigan can support only the few hundreds of thousands it did a century ago. It might not even support the few thousands that it did two centuries ago. We have become dependent upon working together in great and elaborate organizations.

Our ways of working together must be improved by all means personal, industrial, and governmental. They must not be destroyed. It is a reasonable hope that we may continue to work together as an organized nation. If we do so, it is my firm belief that the years ahead will offer us greater security, greater satisfactions, greater opportunities and greater responsibilities. In all of these the Tool Engineer will have a generous share.

Chapter Doings

(Continued from Page 15)

and much longer than any previous one, more active interest being shown than any other subject had aroused. In fact it was necessary to cut off questions due to the lateness of the hour. After the majority had gone a large group remained to continue questions which Mr. Judkins answered fully and satisfactorily.

Dinner at the City Club preceded the technical session.

NEW YORK-NEW JERSEY

F. J. Oliver, Publicity Chairman
239 W. 39th Street, New York.

On the eve of the Machine & Tool Progress Exhibition, over 400 members and guests crowded into the ballroom of the Robert Treat Hotel in Newark, N. J., on March 8th, to hear C. V. Johnson, gage engineer of the Pratt & Whitney Co., deliver an illustrated talk on gages and gaging methods. Reviewing the history of gaging, Mr. Johnson reminded his audience that as ambassador to France, Benjamin Franklin had observed among other things that interchangeable muskets were then being made by the French arsenals. The speaker then reviewed the myriad ramifications of gaging methods and gaging equipment in use today—measuring 5-mm. fuel injection bores, or 16-in. guns or foil 0.0002 in. thick.

Getting down to gage fundamentals, Mr. Johnson maintained that the definition of a gage as a device to determine accuracy and interchangeability should be revised to read: "A gage is a device to improve or maintain quality and facilitate manufacture." No gage can correct an error, but well designed gages can lower the cost of production by preventing spoilage. To do this, it is necessary to bring the working gage right next to the machine where it can assist the operator. In this connection, Mr. Johnson pointed out that the working gages should be more accurate gages than the ones used by the inspection department, although there are many plants where this is not true.

Prior to the technical session, chapter chairman Frank Sheeley called upon Tom Orchard, chairman of the entertainment committee for a report on the supper-theatre party at Billy Rose's Casa Manana held last month. Tom said that almost 600 members and guests were present, and after paying State and Federal amusement taxes, he was

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turning over to the treasurer $220 representing the profits of the evening. He also reported that the treasurer himself, Remo Rege, had disposed of 165 tickets single-handed.

Bill Dinger, chairman of the membership committee reported 76 members and 38 applicants, making a total of 114 potential members of Chapter No. 14.

On April 12, the Wallace Barnes Co. of Bristol, Conn., is to present a talking movie, "The Main Spring," on spring design and manufacture.

PHILADELPHIA

Philadelphia Chapter of A.S.T.E. was chartered with an initial membership of more than forty. The organization meeting was held February 24th, in the Adelphia Hotel Roof Garden. More than sixty engineers enjoyed a delightful dinner and had an opportunity to get acquainted. Present for the dinner and meeting were Ford R. Lamb, National Executive Secretary, and Charles F. Staples, Chairman of the Detroit Chapter.

Conrad O. Hersam, temporary chairman, introduced Mr. Lamb who took charge of the meeting. Mr. Lamb made a very comprehensive address on the history of The Society and gave an outline of the

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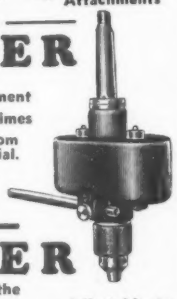

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Jarvis Ground from the Solid High Speed Rotary Files are made in a wide variety of shapes—for every conceivable purpose. They will outlast average files of this type by several times.

"Jarvis Ground from the Solid Rotary Files may be reground many times over at less than one-half of their original cost."

"Other Jarvis Products—Flexible Shaft Machines, Flexible Shafts, Tapping Attachments, Quick Change Chucks & Collets and Screw Driving Equipment."

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method of financing The Society. Mr. Staples was then introduced and gave a very interesting and instructive talk on the formation and administration of a chapter.

Since more than forty applications had been tendered it was announced that the meeting could proceed toward the granting of a charter to the chapter. Many requests were made from the floor for additional application blanks and the sentiment of those present was to proceed with the organization of a Philadelphia Chapter. An election of officers was held with the following results: Chairman, Conrad O. Hersam; Vice-Chairman, Wm. L. Battersby; Secretary, Ed. R. Glenn; Treasurer, Paul W. Frankfurter, Sr.

Mr. Hersam, as chapter chairman, was then presented with the chapter charter and a number of congratulatory telegrams from nearby chapters and the Detroit chapter were read.

The work of organizing the Philadelphia Chapter was undertaken by Mr. Hersam, assisted by Messrs. Battersby, Frankfurter Sr., Glenn and Peter. Many further applications for membership in the Philadelphia Chapter have been received. A membership committee has been appointed under the direction of Mr. A. W. Lovell of the SKF Industries. Mr. Lovell has already started his committee working and it is anticipated that Philadelphia chapter membership will reach the one hundred mark before summer.

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ROCKFORD

Jess Early, Publicity Committee
823 Brooke Road, Rockford, Ill.

The regular monthly meeting of the Rockford Chapter, was held February 18th, and resolved itself into an "All-Rockford-Engineering-Society in Rockford" meeting. Members of the various engineering societies in Rockford attended this meeting of A.S.T.E. Chapter in Rockford with an attendance of approximately 450. Exhibits were also in evidence which had been supplied by various manufacturing companies in the vicinity of Rockford. The fine attendance provided a grand send-off for what is planned to be an annual convention. The engineers and their guests gathered at 6:00 P.M. and at 6:30 were served an excellent dinner with Mr. L. Harold Clark, President of the J. L. Clark Manufacturing Company, acting as toastmaster. Following the dinner, the audience spent more than an hour inspecting the various exhibits, asking questions and discussing the various displays. Mr. Gustaf Johnson, member of the joint committee, was in charge of the exhibits and did a masterly job of providing a good show—especially considering the short time in which he had to handle all the details of the show.

The technical session was addressed by C. E. Kraus, Ingersoll Milling Company. The subject was "Fundamentals of Metal Cutting." He spoke in detail on the effect of the cutting edge of a tool as it cuts, conditions met in cutting various material, the built-up edge on the tool, speeds and feeds of cutting and their effect on the finish of the work. Blackboard sketches were used to bring out various points. Following the address, moving pictures were shown, illustrating "Step-milling" and some of the tremendous cutting speeds that are attained by its use. A very interesting discussion of the various points brought out in Mr. Kraus's talk followed and kept the speaker busy more than half an hour.

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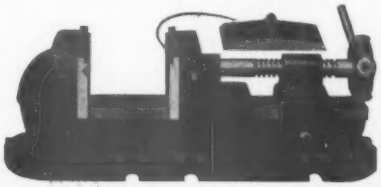

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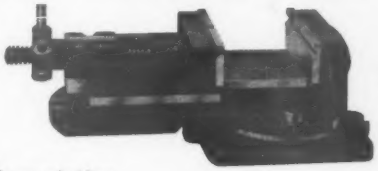

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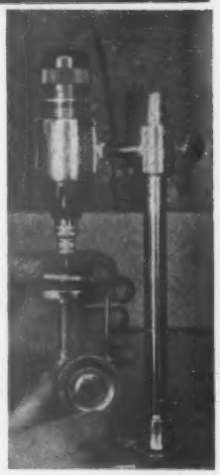

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The joint committee of the various societies who worked out this convention meeting were as follows: Judson H. Mansfield; E. W. Dickett, S. F. Manning, Lawrence R. Foote, Alan C. Mattison, Raymond H. Clobes, Gus Johnson, Ernest R. Ekstrom.

TOLEDO

Walter L. Ulrich, Chapter Publicity Chairman c/o Spicer Mfg. Co., Toledo, O.

The Toledo Chapter reached another milestone in its attempts to entertain its members and friends who turned out one hundred and sixty-eight strong for the card party held at the Toledo Yacht Club Friday evening, February 18, 1938.

The attractions were many and varied and under the excellent direction of our entertainment committee headed by Walter Seeman, sufficed to make this evening one of pleasure for all those present.

At the conclusion of the card playing, table prizes were awarded. The group in a body then gathered in the ballroom to witness a fine program of entertainment after which the drawing for the door prizes, which were donated by friends of the A.S.T.E., took place. An exciting half hour was used in dispensing them. The name of Mr. Barbeau, who donated the main prize, a beautiful midget radio, was announced as winner of this prize. At Mr. Barbeau's request, however, another name was drawn, and Mrs. Melvin J. Feak was proud winner of the radio. Fifteen other prizes including a seltzer water bottle, a pair of modernistic bookends, a desk thermometer, pipes and other valuable articles were awarded with the able assistance of Mr. Seeman.

Following the awarding of the door prizes, luncheon was served.

It will be of general interest to know that Mr. Irwin Hayes, chairman of the Industrial Relations Committee, was able to place two members in positions that will no doubt result in mutual satisfaction to employer and employee.

ST. LOUIS

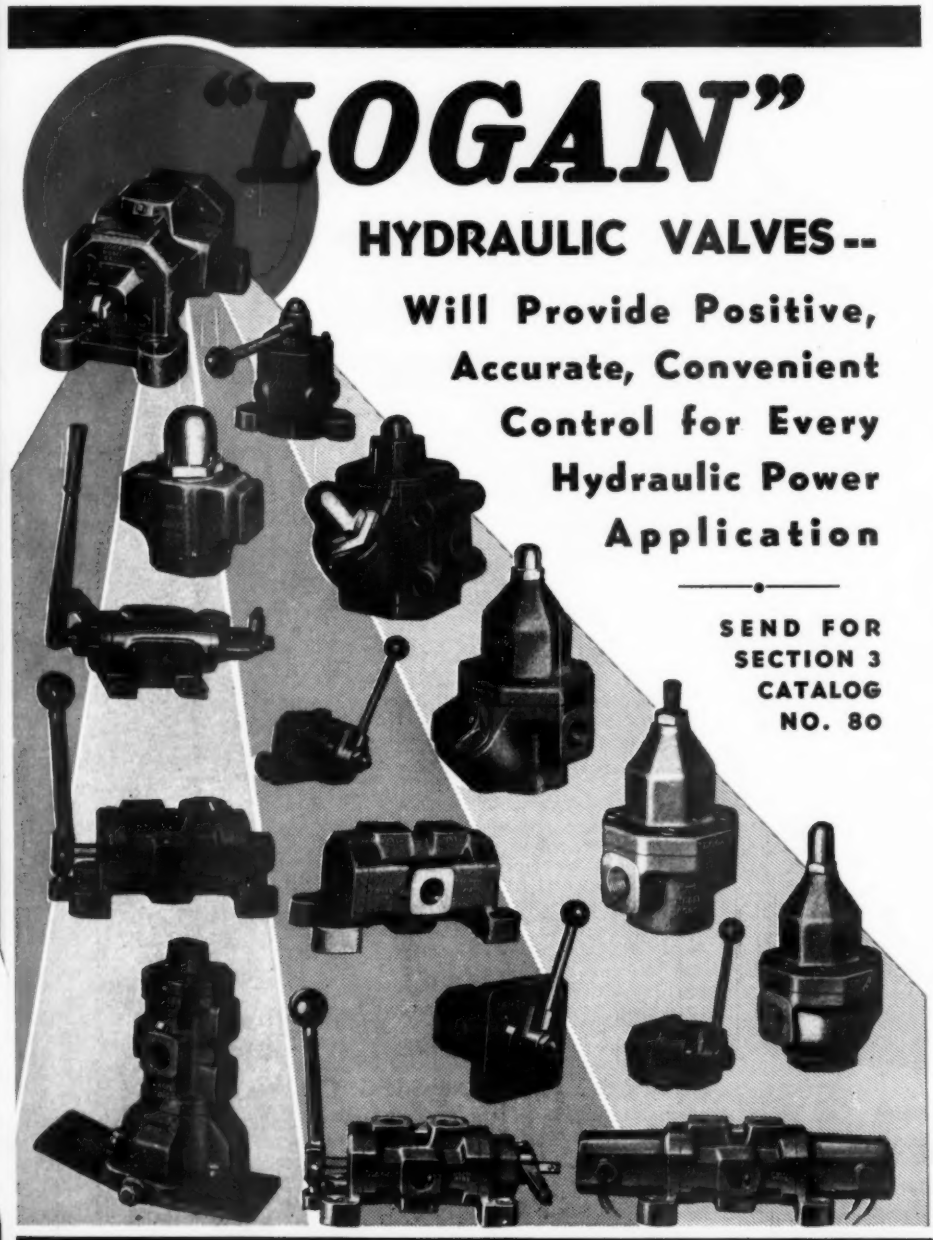
On March 3, 1938, the St. Louis Chapter was officially chartered as a bona fide member of the A.S.T.E. Mr. Ford R. Lamb accompanied by Mr. Joe Siegel explained the purpose and aims of the society and the group voted unanimously to proceed with membership. After the charter was presented the following officers were elected: Chairman, Mr. E. A. Doogan, Hussman Ligonier Co.; Vice Chairman, Mr. C. M. Andrews, Wagner Electric Corp.; Secretary, Mr. H. F. Tomasek, General Metal Products Co.; Treasurer, Mr. H. Linders, Wagner Electric Corp.

At the meeting the seven men who took care of the preliminary organization work were commended by the National Officers. These men were: C. M. Andrews, H. Rebesberger, E. A. Doogan, E. L. Reller, R. Hartsock, R. C. Sekyra, H. F. Tomasek.

This meeting clearly displayed that the St. Louis Chapter has just scratched the surface and that there are many Tool Designers, Production Executives, Master Mechanics, and Tool Room Foremen, who are eligible for membership, but who have not as yet been contacted. Those interested in membership should contact the chapter secretary, H. F. Tomasek, % General Metal Products Co., 3883 Delor St., St. Louis, Mo., Riverside 3400.

He will be glad to supply information and application blanks.

The following men have been appointed committee chairmen: Meetings, E. A. Laffler; Membership, R. Hartsock; Industrial Relations, E. H. Nieman; Historian, R. C. Sekyra; Fellowship, W. G. Ehrhardt; Standards, E. L. Reller.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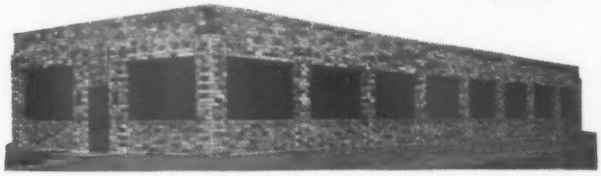

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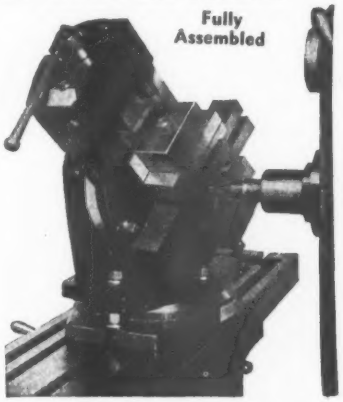

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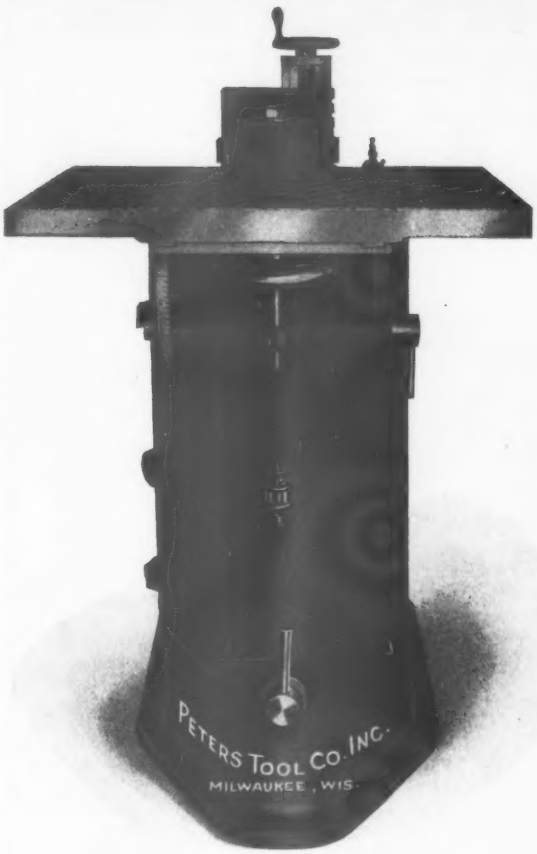

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For a thousand and one tough hand jobs

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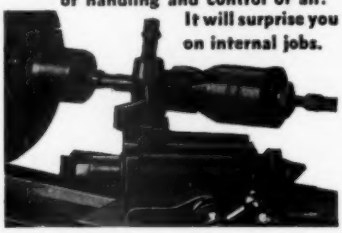

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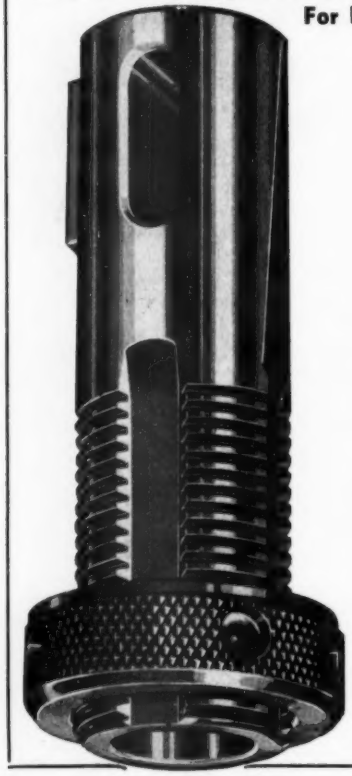

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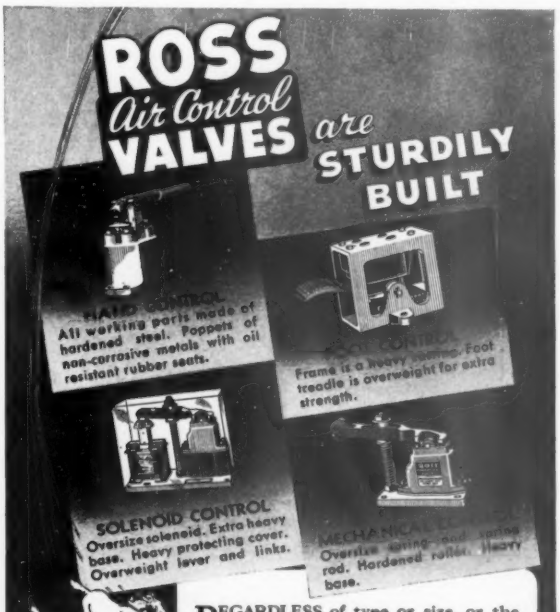
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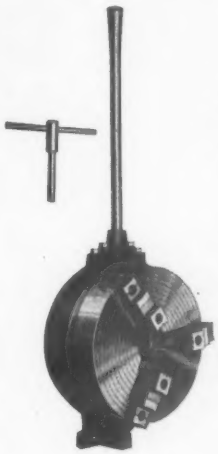

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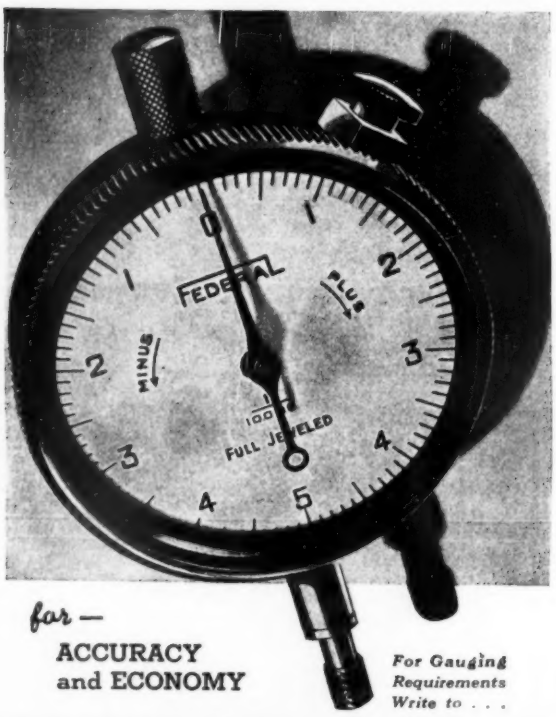

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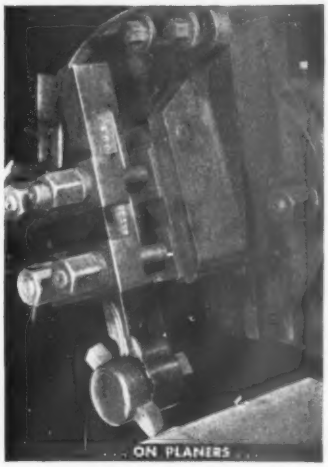

Now that production is catching up on back orders and business is again settling down to a business basis, the *costs* of every operation are becoming mighty important. Unless controlled, cutting costs are apt to eat into profits heavily. Because tool makers are tool makers and machinists are machinists, if given a job to do, they'll devise some way to do it even if they haven't the right ARMSTRONG TOOL HOLDER for that particular operation. But "home made" tooling is costly. Hours spent forging, hardening, and grinding tools are hours lost, and at the same time machines stand idle, adding up profitless machine hours to be charged against the job. Reduced output, increased spoilage, overtime and all the bi-products of makeshift tooling add to cutting costs and reduce profits.

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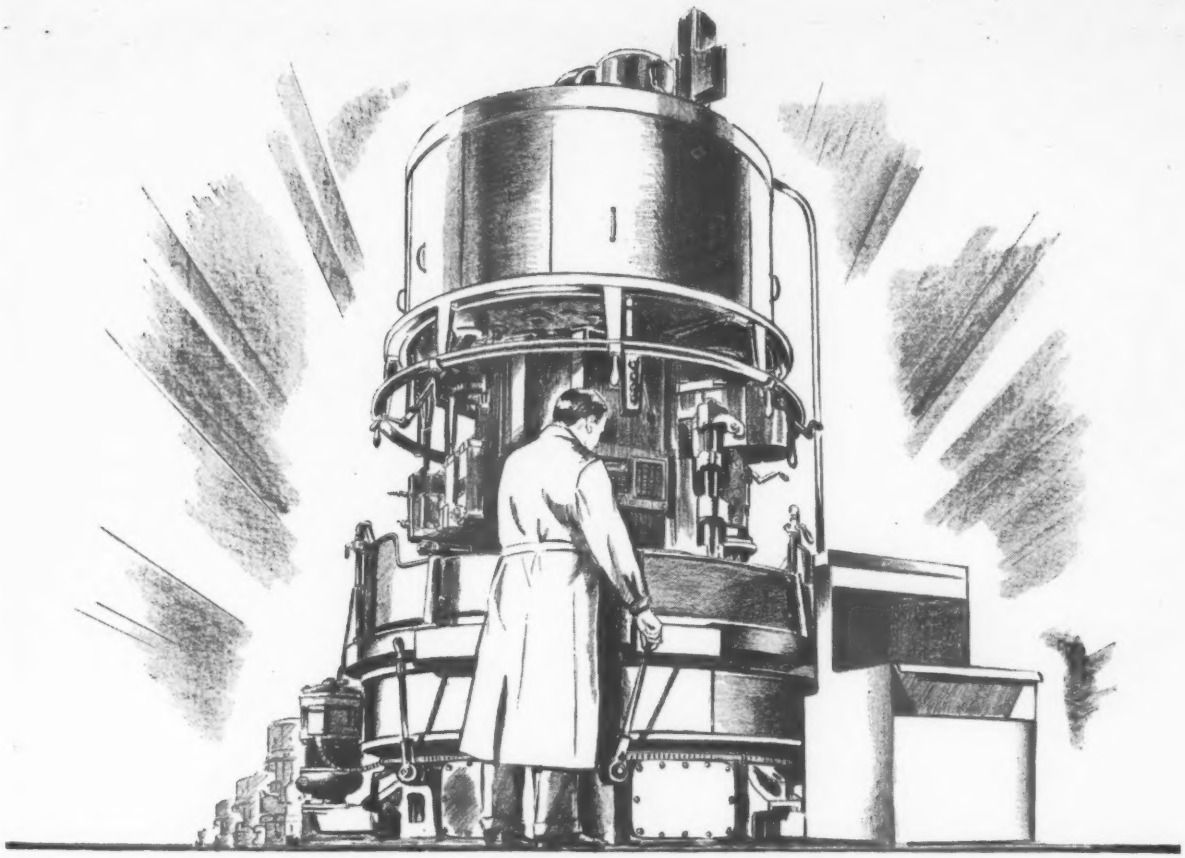

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